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# AMAZING STORIES

## *Science Fiction*

Vol. 10

MAY, 1935

No. 2

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# AMAZING STORIES

## THE MAGAZINE OF SCIENCE FICTION

VOLUME  
10

May, 1935  
No. 2

T. O'CONOR SLOANE, Ph.D., *Editor*

Editorial and General Offices: 461 Eighth Avenue, New York, N. Y.

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*Extravagant Fiction To-day . . . . . Cold Fact To-morrow*

---

## Gliding and Soaring

By T. O'CONOR SLOANE, Ph.D.

"OH that I had wings like a dove! for then would I fly away and be at rest." This is a most human aspiration voiced by the Hebrew poet. For man has long envied the bird and other flying creatures their power of winging their way through the air. It has been said that if the minds of the smaller flying birds were of sufficient capacity, they would envy the power of locomotion of animals over the earth's surface. A sparrow or a robin (so-called, but it is really a thrush) is an example, showing when on the ground the curiously inferior way of walking or running, common to many flying birds. The ostrich cannot fly, but he can run as fast as a horse. He is a bird it is true, but not a flying bird. The combination of good running and flying power is not possessed by all of our feathered neighbors.

In Ovid's "Metamorphoses" we are told the fabled story of Daedalus and his son

Icarus Daedalus, to escape from Crete, was said to have constructed two pairs of wings, with feathers and wax, and they proved his son's undoing. Icarus, the son, flew so high that the sun melted the wax of his equipment and he fell into the sea and was drowned. It used to be called the Icarian Sea in memory of the death of the young man, whose less ambitious father soaring at a lower level reached the Grecian shore in safety. Many an airplane has been wrecked since those mythical times.

An "amended" version of the story of Daedalus and Icarus form the third of "The Lemurian Documents," which appeared in *AMAZING STORIES* of May, 1932, as a part of J. Lewis Burt's amusing series.

Roger Bacon who lived in the early part of the thirteenth century was a Franciscan Friar. He was a great student and writer, and to him is ascribed a knowledge far in advance of his time.



He is credited with the invention of gunpowder—had he foreseen what it would do in destroying poor humanity we hope that he would have let it alone. So much knowledge of things is credited to him, that he seems to have been far ahead of the rest of his world. Many attempts have been made to interpret the old records to see if he had any views on the possibility of man's flying. Naturally he is credited with such views on the subject, just as other things, centuries in advance of their consummation, undoubtedly excited his attention. He died nearly two hundred years before the discovery of America and about as much before the art of printing was perfected.

Leonardo da Vinci may fairly be taken as one of the first men to seriously attack the subject of flying. In a treatise entitled "On the Bird's Flight," he takes up the flight of birds, of bats and of insects and then attacks the subject of the mechanical flight of man. On the same sheet of paper, on which the parachute spoken of in our April issue appears, he has a number of sketches illustrating his ideas about men flying. There are a number of explanatory memoranda accompanying them. Of these sketches the tent-shaped parachute is the most complete, perhaps because simplest, as the others are devoted to various experimental demonstrations. His mind was fixed on the flight of birds, the reaction of the air against their wing strokes; he did not grasp the idea of flying with motionless wings—of aeroplaning or motorless flying.

His subject was to lie face downwards on the frame of the machine. By alternate pushing with his legs, and using his hands and arms if necessary, a pair of wings, on the lines of a bird's wings, were to be kept in motion, flapping up and down.

The first thing that a reader might say would be that a light weight motor was

unknown in those days, so that Leonardo was hampered in his attempts at flying. But what would he have thought, if he could have foreseen that with motionless wings, and with no motor and using no propelling force, men should soar between one hundred and two hundred miles in a single flight, spending hours in the air like a condor or an albatross. The invention of flying, given the gasoline motor, is nothing to the achievements in soaring, as far as the wonder of it is concerned.

Leonardo gives various sketches of his flying-machine. In one of them the structure of the frame, on which the operator is to lie face downward, is quite clearly shown. In another which is not so clear, the operator is shown in position, with one leg drawn up ready for the thrust backwards which is to actuate the wings. The head goes through a ring, which is moved to one or the other side controlling the rudder, so as to steer the machine to left or right. The hands by suitable mechanism may assist the legs in actuating the wings. The rudder in one sketch is shown with vertical and horizontal blades, so that it can change the pitch of the machine, sending it up or down in addition to effecting lateral steering.

He also shows a machine for testing the lifting power of a wing. Its lifting power is to be expended in raising a weight.

Then there is a sketch of a helicopter which he says can rise in the air. Toy helicopters have been made, which would rise to the roof of a three or four story house. But the details of Leonard's helicopter are not fully known or discernible.

In anticipation of the flight of his flying machine, he wrote.

"It shall take its first flight, the great bird, from the summit of the Swan Hill (at Florence) filling the universe with wonder, all written documents with its

fame, and everlasting glory will befall the nest in which it was born."

An interesting factor in wing-flying, as distinguished from soaring, is the widely varying frequency of wing-beats. The bee gives 200 to 300 beats per second, the sparrow 13 and the pelican  $1\frac{1}{2}$  per second. The latter gives a close approach to soaring.

The old inventor's wing-flying has never been carried out—the nearest approach to it is in helicopters. Among animals a parachute effect may obtain so that they glide. The flying squirrel glides a long distance as he gradually descends towards the ground level. There is a theory that the ancient pterodactyls were gliders. The flight of the bat, of which the pterodactyl may be taken as the prototype, leads to the belief that the ancient, winged reptile really flew.

But man has never flown, he always glides or soars as he navigates the air. In the case of the motor-driven airplane a factor enters that may have much to do with the flying bird. The curved plane drawn through the air by the motor has a rarefaction or partial vacuum produced above it, over its upper curved wing area, and this operates to bear it up. It is quite likely that the bird's wing, acting to propel the bird forward, is subjected to this characteristic partial vacuum so as directly to sustain the body. But the humming bird, virtually poised on its wings, quite motionless over a flower, probably cannot have his supporting partial vacuum. It also does not seem that flat-winged insects can have it, if we hold to the distinction between supporting pressure and supporting vacuum, one applying to the under surface and the other to the upper surface of a wing of bird, insect or airplane.

We may go a step further than this. Octave Chanute, b. 1832, a civil engineer, in 1894 became interested in gliding and accomplished 2,000 flights with

various constructions of gliders, while Otto Lillienthal, who was a famous glider, b. 1848, was killed in 1896 by a fall in one of his glides.

The records of these attempts showed that there was no real soaring done. We are told that they descended at angles, duly recorded, but never that they were supported at a fixed level in the air. We can imagine how they would have been astonished at the thought of the modern achievements in soaring, where a soaring flight lasts for hours and covers many miles. The flights of Octave Chanute and Lillienthal were recorded in feet of travel and angle of descent. We never hear of their angle of climb, they went down virtually all through their glides.

The Wright brothers operating on the same lines, and with the prevalent idea that a head-wind was the almost essential supporting element in gliding, went to the Atlantic seashore and obtained some results in short glides, but while undoubtedly they had in their minds the idea of using a motor in a plane, they started to develop the matter by gliding. Chanute, the civil engineer, was in their counsels, with his experience.

The records in those early days included the figures for the length of the glide and for the feet of descent. The latter figure was stated in feet of fall per hundred feet of glide, and often ranged in the neighborhood of six to ten feet descent per hundred feet of glide. And all the while that one man after another tried what distance he could cover in a glide, and acted on the belief that the horizontal component of his motion was what sustained him, and that a head wind would act to keep him up, yet he failed to realize that air had other motions than horizontal ones and that the atmosphere was full of ascending currents. Forward progress could be made by letting these currents blow the plane upwards, and by taking as occasion offered

itself, a long swoop forward and downward. When another rising current was reached the plane would be picked up and raised to a new elevation to be ready for another gliding flight.

Sometimes a wind encountering a hillside, will be deflected upwards and will carry a motorless airplane to a greater height. Sometimes rising currents are encountered in the vicinity of the edges of clouds and the accomplished glider will keep himself in the air for hours at a time by utilizing these currents. Various maneuvers can be executed with a glider plane; figure of eights are of the spectacular order and are often used to get the plane where it is wanted.

The spectacular effect of gliding and soaring is greatly enhanced by the silence of the motion; there is no engine exhaust to disturb the neighborhood, but of course there is far slower progress than with engine-driven plane.

An interesting feature of the early work of the Wrights was an air tunnel through which a blast of air was driven, and model wings and planes placed in the current would give results leading to the development of improved structure.

The study of the action of airplanes and airfoils moving in the air, following the above cited example is now carried out in tunnels so called, large tubes, perhaps six feet or more in diameter through which air is blown. The great object is to get a current of air, uniform in all parts, without any eddies or disturbances. In this the object to be investigated, it may be a wing, often spoken of as a foil, is supported and the air is blown through the tube. Instead of motion through the air this gives air moving past the stationary object. A great increase in our understanding of airplane flight has resulted from the use of wind tunnels. There is no doubt that eddies result from the action of the solid stationary object and the moving air current, but it is fair

to say that these exist only or nearly so, in the air which has passed the model under trial.

The apparatus suggests the naval tank used for testing models of ships. These models are towed the length of the tank, and records are taken during the few seconds that the passage takes. A much wished for improvement would be to operate it as the wind tunnel is operated. The water then would flow and the model would be stationary. But it is virtually impossible to do this.

Many years ago the statement was made that if a properly balanced little plane were placed in the air at a high elevation it would float. This was treated without much respect. For a plane to soar something more than correct balance is essential. Intelligence is required to pick out the supporting air-currents and to descend for progression, and to rise to attain elevation for the next descent. The condor's or albatross' instinct takes them through the air with motionless wings. It is fair to say that in many birds the flapping of the wings is principally to drive them forward, an instant of planing after the drive ahead carrying them upwards or on a level as desired.

If one is once possessed with the idea that flying is made up partly at least of soaring, the flight of many birds is explainable. Even the birds who do no perceptible planing, may create a wind that supports them. The action of the air on the curved wings of an airplane is far from simple. A partial vacuum is produced over the upper surface, and this vacuum operates to support them. The same may occur in the case of birds' wings.

But the early airplaners, as Lillienthal, Chanute and several others may be termed, never realized that soaring was within their scope, although the "air" was all before them where to soar, a paraphrase on a great poet's words.

# The White City

*We hear a lot about improving the slums of great cities, but here we have an interesting variation on the theme carried out in Dr. Keller's inimitable style. An interesting episode appears at the end of the story bringing about a situation of things entirely unexpected by the reader.*

By DAVID H. KELLER, M.D.

THE two men sat on a log talking.

They were in a little Vermont valley, just a few acres of green land surrounded by the forest, and on every side the mountains rose around the forest. The shadows cast by the western mountains were creeping toward the log.

"I can tell the time of day by these shadows," whispered one of the men.

"From sunrise to sunset there is not a time that the shadows do not fall on this farm from the mountains. If the cow barn is reached, it is ten in the morning, provided it is June. At three in the afternoon there is shade in the back pasture. Of course, at noon, in the summer, there is no shadow for a few minutes, but the mountains are so high and the farm is so small that it just makes a perfect sundial. A man tried to sell me one of those brass things once to put on top of a high stone, but I said to him, 'What do I want a thing like that for, when I have the old farm?'"

"But the sun don't shine in winter?" argued the visitor.

"No, but then I use my hour glass. Got the idea from a timer for boiling eggs I saw in a store. Made a bigger one out of two glass jugs and a piece of glass pipe. Every six hours it has to be turned upside down. Cute little thing but I don't need it. You see, time does not mean much here, and I have other ways. Take a rooster. He tells me the

hour during the night and if the stock is not fed promptly at six, they tell me about it till I do feed them. But I like the shadows the best of all. It took me a year to work them out, but after that it was easy. They come at the same place at the same time on the same day of every month. Much handier than a watch. A man does not have to wind the old sun up every night and have the mainspring repaired every rip-stitch."

The visitor laughed.

"You are a perpetual source of amusement and wonder to me, John," he exclaimed. "I knew your father, and he was just like you are. I have sat with him on this same log and he talked just like you about the shadows. But you had a college education. You played football and everything else at Yale. We all thought you would become a stockbroker in New York and marry money. Instead, you came right back here to this little farm, and when I come to see you, the first thing I hear is this talk about the shadows and that you do not need a watch to tell time. You are just like a Zulu who graduated from Oxford and then goes back to Africa and drops into his old life as a savage. Just what is your idea?"

"Simple enough, Mr. Vanderbie. In the first place, I like this old farm. Eight generations ago my folks were killing Indians here. Sometimes the Indians killed them. There are sugar maples down in the pastures that my



*From twenty office buildings French 75 mm. guns poured shot after shot of high-explosive shells on the three ships. Not one missed the mark.*



folks were tapping before the Revolution. I remember my grandfather. He used to say to me, 'John! You take care of the farm and it will take care of you.' My father used to brag that, if something happened to cut off the farm from the rest of the world for ten years, at the end of that time he and his family and his stock would be alive, well clothed and hearty. I tried that for one year after I graduated. You see, I was sick of seeing people and doing things, so I just came out here, took care of the farm and had it take care of me, and for a year I did not spend one cent. Even took down the mailbox and told the R.F.D. man not to bother with my mail, but just hold it till the twelve months were past. It was a little lonely, but peaceful after all those years in college."

"I suppose you know what your college friends said?"

"Sure. They said plenty, but after some of them ate a few dozen of my buckwheat cakes with my buckwheat honey and salt butter on them they did not talk so fast. I even made my own salt. Deer lick in the woods, and I got enough salt there in a few days to last me a year. Perhaps it was not real salt, but the deer liked it and I thought that if they could stand it, I could."

"Going to keep on living this way?"

"How can I tell?"

"Would you like to make some money?"

"Now you are talking like a New Yorker. I had a dozen chances to go into business after I graduated. A man wanted to name a five-cent candy bar after me and showed me a contract for five thousand a year. Six people wanted me to sell stock when the only stock I knew anything about are horses and cattle. What do I want money for? I have money. Dad had ten thousand in government bonds when he died."

"You can go places if you have

money," explained Vanderbie. "Travel and see things, shoot big game in Africa, play polo in England, get married, have children, send your sons to Yale."

"Is that supposed to be an attractive life?" replied the Vermonter. "I think I should rather stay here and milk my cows. Just what is on your mind, anyway, Mr. Vanderbie? I know you did not come up here just because you were a friend of my father."

The old man frowned, as he explained the reason for his visit.

"It is like this, John. My folks lived as long on Manhattan Island as your folks have lived here in the valley. After my wife died I started in to look up my family. Of course, I knew about them in a way, but I never really learned the real facts. The first Vanderbie had a farm in New York City. Think of that! A real farm. I found out where that farm was and, to my great surprise, I learned that I still owned it. Of course, it was all covered over with tenement houses and dirt and filth of every kind, but the land was still there. You see, our family never sold land. No matter what happened, we never sold land. That is why I am rich today. No matter how great the depression, nothing happened to the land. I went down there and saw the farm, and somehow, I said to myself, 'What would my No. 8 great-grandfather say if he saw the way the family had taken care of his farm?' And I had a vision of putting the farm back on Manhattan again, just as it was when the first Vanderbie bought it from the Indians.

"A FARM right in the slums of New York! Get the idea? A farm with pasture and corn land and a barn, and a spring-house. Real cows and a team of horses and some stone fences.

A farmer living there, making hay and milking his cows and raising his own pork. Not dependent on the city for anything. After everything was in running order I thought it would be swell to send the school children there on Saturdays to see how a real farm was run. That was an idea I got from the newspapers. It seems that in Los Angeles there were over three hundred children who had never seen a cow; so the school authorities had a cow brought into the city and had the children watch while she was being milked. Other men gave museums and art galleries to New York; so, I thought I would give a farm.

"I started in with the idea three years ago. First, I had to have all the buildings torn down. They belonged to me, so that part was easy, and they were all nearly falling down, anyway. Then the cellar walls had to be taken out, and I had a lot of trouble having the streets closed, but just at that time I helped elect a Mayor for New York and I had some influence. At the end of a year all I had was just a vacant spot in the slums of the city. Nothing would have grown on it. It took thousands of truck-loads of soil to make it look like anything. The next thing was trees, because I wanted a wood-lot and I did not have time for trees to grow, so we moved them, and each tree cost from two to five thousand dollars. I nearly forgot to tell you about the spring we found. I built a stone spring-house over it. And then there was a fence. Pity about that, but it had to be high and barbed wire, or my neighbors would have ruined my work as fast as I finished it. I found a very old picture of a farm house, and I had one built just like it out of logs. A real log house, right there in little old New York, and a barn.

"Everything is ready for the plough-

ing. I have not any stock or poultry. The trees are growing nicely, and I have a two-acre pasture of red clover. Do you know what they call the place? 'Vanderbie's Folly!' But I have promised it to the city for a park when I die; so, they simply think I am insane and make the best of it. Now, I am hunting for something. I want to find a man who will go there and live a year, perhaps five years, and farm that place, raise pigs and chickens and make his own butter, and keep bees, and keep warm in winter by cutting down my thousand-dollar trees. I want a man to come there and show the New Yorkers that a man can live right there, and not be dependent on the railroads and ferries and stores for his bread and butter. That is why I came up to see you. Said to myself: 'John Johnson's son John could do it if he wanted to.' How about it? Live there for five years and run a farm-show for the children of New York, and at the end of that time I will give you exactly one million dollars."

The young man moved restlessly on the log.

"How big is the farm, Mr. Vanderbie?"

"About twenty-five acres."

"Any shadows?"

"The finest in the world. Just on the edge is my new office building. I live on the top of it, twenty-five stories above the street. Just a little building, but it has its shadows, John. On the other side is a church, and that throws shadows on the farm. I have gone in the log house at times. It's peaceful there. Not like this, but I have spent a lot of money putting crickets and katydids around the place, and toads, and squirrels. I said to myself, 'The man who lives here will want to hear the katydids in August.'

"And I have a family of ground hogs living on one side of the wood lot. Of course, there are a lot of things I have

overlooked that you will want to tell me about, but those are just details, John Johnson, and we can make it a real farm if you will take my offer."

"You live just on the other side of the road?"

"Yes. In a penthouse. I started to build the office building about the same time I started fixing up the farm. Had to have a place to live and thought it would be nice to sit where I could look down on my neighbor."

"You New Yorkers know how to do that perfectly," said the young farmer sarcastically. "I met a girl from New York in my senior year at Yale. She asked to be introduced to me, but when she found that I was just a farmer getting an education and that I was going back to the farm, she walked out of the room and out of my life, and I was so mad that I didn't even try to remember her name, but I knew she was from New York. I never did care much for women, and that made me decided in my views. If I come to New York, I do not want to have to fuss around with any women. Write that in the contract, will you? And I forgot to ask you one thing. You and your family have always lived in New York. You people never do anything, unless you can make money doing it. You have a big investment in that farm. How are you going to cash in on it?"

The rich man laughed.

"I own one of the three big papers in the city. This farm, after it starts running, is going to be worth from a half-page to a page of real news to my paper every day, and I figure it will put the circulation up at least a million. Children can be born by the thousand in the city and, unless they come five at a time, it's no news, but when one of your cows has a calf, John, that will be real news. I bet there hasn't been a calf born in that part of Manhattan for

over a hundred years. It is what the reporters call a scoop."

"You have made two mistakes, Mr. Vanderbie," cried the young man. "You should have put your farm on Forty-second Street with the other sideshows, and you should have asked someone else to be your show farmer. The shadows have reached the granite rock and that means supper time. You were my father's friend, and I want you to stay to supper and sleep on one of my feather beds, but if you were not an old friend of the family's, I would take a pitchfork and run you off the farm."

"I did make a mistake, John," admitted the older man, laughingly. "I thought you had the ability to take this job and make a success of it. I was wrong."

"Just for that I'll come to New York! No man can tell a Johnson from Vermont that he can't take any job and make a success of it. I do not want your million, but if you want a real farmer in New York City, you have found one. Now, suppose we have some ham and eggs? It is a little early for scrapple and sausage."

\* \* \*

THE farm in New York was all the sensation Vanderbie expected. It was real news, not only to his paper, but to every other paper; not only in New York, but throughout the nation. The heavy wire fence had to be strengthened. Special police had to be put on duty. Every day was a holiday, as far as the crowds around the farm were concerned. Real estate boomed in the neighborhood. Hot dog stands, beer parlors, restaurants, movies, occupied every vacant floor space on all four sides. In at least a hundred office buildings, window space with the use of field glasses was at a premium. On Saturdays children by the thousands were

shown over the farm by teachers appointed to the task by the Board of Education. Very orderly, very interested, very methodically they were marched hour after hour in columns of two, past the wood pile, past the chicken yard, past the cowshed, past the spring house, with its rows of spotless crocks of milk and cream and butter. They walked around the fields, down by the woodlot. They stood gravely listening to lectures on agriculture, horticulture, and every other kind of culture used on a farm.

Adults were not allowed inside the wire fence unless they accompanied school children. Exceptions were made of prominent officials, a few selected reporters, and distinguished visitors to the city.

Through it all John Johnson went ahead silently with his farm work. Busy for hours at a time, there were other hours when he sat moodily on a log, watching the shadows from the church, watching the shadows from the tall office building, watching the shadows and wondering how many kinds of a fool he had been to accept such a job for no other reason than that a man had told him he could not do it.

His fan mail was enormous, but he never saw it. Thousands who never saw him wrote him lengthy letters of advice. Other thousands asked him to go into advertising rackets. He received offers from the movie magnates, from lecturing bureaus, and last of all from hundreds of women who wanted to come and live on the farm with him as his wife. Presents showered on him. Animals and birds of every kind, varieties of seeds, farming implements, clothing, furniture. All mail was answered, all presents acknowledged by secretaries to Mr. Vanderbie. The sending of a present, the acknowledgment of it, was headline news in any paper. For example, the editor of the

*Main Street Critic* of Pennsburg, Pa., wrote:

"Hiram Johnan, prominent feed and flour merchant of this town, received word today that John Johnson, the prominent New York farmer, has received the peck of white clover seed sent last week by Mr. Johnan, and will use the same on the lawn in front of his log cabin. Thus, once more Pennsburg merchants show their ability to satisfy the world."

or from Steelville, Ohio, came the announcement:

"From now on John Johnson, the only New York City farmer, will use a Nonrust, Eversharp pitchfork in feeding his cattle."

It was publicity in CANNON TYPE.

And the greatest of the financial harvest was reaped by Vanderbie's paper. It was the first to announce the birth of a baby calf, the first to tell of the planting of the buckwheat, the first to tell how John Johnson had killed a rattlesnake (placed there without his knowledge in the hopes that he would find it), or cut down a three thousand dollar tree for his winter firewood.

Bets were made as to how long it would last. What would John Johnson do when he needed a dentist, when he had to have new clothes, when he ran out of soap or flour? Vanderbie covered all bets thrust at him. The Farm Page of the *New York News* was headed day by day with the statement:

JOHN JOHNSON WILL LIVE  
ON HIS FARM FOR FIVE  
YEARS WITHOUT THE  
HELP OF ANY NEW  
YORKER!

And Johnson did! He had a few sheep, sheared the wool, spun it, wove it and made his own clothes. He took fat

and ashes and made his own soap. He pounded his wheat into flour and made his own bread. He even grew some tobacco, cured it and smoked it (though never with any great pleasure).

Every Sunday afternoon, as per the contract, he talked for one hour with reporters from the *News*, walking over the farm with them and telling them about the farm events of the week. One hour, never any more, never any less. He met them at the gate and left them at the gate, locking the heavy iron bars after they left. Sunday was his day. No school children then!

On the first Sunday in each month Vanderbie took supper with him and spent the evening. The two men were very fond of each other, though they did not show it. The old man had his worried moments, not in regard to the money he had spent on the farm, but on account of the man he had placed there. He wondered what five years of such a life would do to him, what he would be like when it was all over, what he would do with the million, and whether he would finally take it.

IT was late September of the second year at the farm that the two men were again sitting on a log out in the woodlot. Johnson was clean dressed, clean shaved, clean eyed. If the months had hurt him in any way, he did not look it.

"It is going to be a busy fall for me and the two horses, Mr. Vanderbie," he remarked casually. "I have to get in a lot of fire wood, all I can find time to cut, and I have to save every piece of grass and every seed I can for the cattle and chickens. It is going to be a long, hard winter. In fact, I do not know when I have seen such certain signs of a hard winter. How is the roof to the house? Stout?"

"That roof would stand anything,

John. Perhaps you do not know it, but that is just a log house on the outside, and the same goes for the barn. They are steel, and made to stand anything. I had some peculiar fears before I went into this venture; so I had it constructed to stand anything. Those window shutters would keep out machine gun bullets. The walls and roof are bomb proof."

"That is a good thing," explained Johnson. "I have seen roofs cave in under a heavy fall of snow. Gets heavy when it gets wet. This is going to be a hard winter. Worms are way deep in the ground and the woodchucks work as though they were going down to China. Wool is heavy on the sheep and the nuts have a thick shell on them. The squirrels are laying in stores of food and their winter nests are three times as big as I have ever seen them. Going to be a hard winter."

"Wanted to talk about that," commented the rich man. "How about closing up and going to a hotel for the cold months?"

"No, indeed. Who would take care of the stock? No. I am going to stay right here for three years, four months and twenty-seven days more, but I am just telling you it is going to be a hard winter."

That same night Vanderbie went to Washington. He went to the Chief of the Weather Bureau and told him all that Johnson had said.

"Nothing to it," replied the official. "We have hard winters and we have mild winters. Every farmer has a dozen different ways of telling what the winter is going to be, and if they happen to guess right, they become prophets in their own country, but not with us. We make our predictions scientifically, and right now we expect nothing unusual. I have read a lot about this man Johnson. Publicity has gone to his head."

The newspaper man thought it over



on his way back to New York and decided that Johnson's warning was not news.

October was mild.

November was milder.

Johnson kept on sawing and chopping wood. Every blade of grass, every bit of grain went into the haymow or the grain bin. Nothing was wasted. Wood was piled everywhere, in every available space. The surplus pigs were killed, smoked or salted down. Even one of the cows was killed and the meat smoked and salted.

December passed without a flake of snow.

ON the first of January the snow began to fall. It was not very cold, there was little wind, there was nothing except just a gentle fall of snow. The next day, even though it was still snowing, the streets were cleared. It snowed all the next day, all the next night. It kept on snowing. The dirty snow was piled high in the street. Every unemployed man was at work clearing the streets, clearing the railroad tracks, working, getting paid for it, spending the money. It meant prosperity for the poor.

On the fifth day of the snow storm the city suddenly woke up to the fact that something unusual was happening. By that time the fall, on the level, was over three feet. But three feet in New York was something different than three feet in the country. There was no place to put the snow. All the snow had to go on streets, and there was not enough street to hold it. It had to pile up. The time came when there was no more traffic, when walking a few blocks was an adventure and a mile an impossibility.

And it kept on snowing.

The nation became interested. New York was in trouble. New York had

to be saved. But, while millions were eager to help, they found it hard to know what to do. It was gradually growing colder. The rivers were frozen. The sewers were clogged, the trains blocked. The people of New York were starving, and, while food was abundant throughout the United States, it was almost impossible to get the food into the city. The people of the city were cold, but wood and coal had to be carried and the trains had stopped running; the highways were blocked.

For decades New York had depended on the world to feed it, clothe it, keep it warm. Always there was milk for three days, food of a kind for a week, canned food for two weeks, meat for a week, coal for two weeks. The city used these things and got more. Now it used them and could not get more.

Had the ordinary channels of communication remained opened, with the city starving, there would have been riots, pillaging, and desperate panic. With the snow rapidly blocking every street, the people went home and stayed there. There was fear, some robbing of stores, some distress, but for a while nothing like a panic of the millions. The chief reason for the ease of the first few days and weeks was the hope that it would stop snowing at any moment. *It always had.* People told each other that it was unusual, but, outside of a little hardship, it meant nothing. When the real truth was realized, it was too late to do anything. Each family stayed by itself. Back of this was a selfish desire not to share the little they had with others who had less.

Doors were locked and nailed shut. Windows were closed and barricaded with furniture. Five million people went back into primitive isolation. With this return to ancient habits came a return to religious conventions. Those who had never prayed before started appeals to

the God they had long forgotten. The prayers were all the same, no matter what language was used or what gods were petitioned.

"Help us to live till it stops snowing!"

It snowed steadily all of the month of January. It was a storm without wind, without low temperature, without cessation. By the end of the month the city had become a white city, with the snow one hundred feet high in the streets. Those who lived above that level looked out on a clean city. Each day, every night, any stain on the snow was covered with a fresh mantle of loveliness. Much of the older part of the metropolis was covered. The taller buildings stood out; the ones built decades before disappeared.

JOHN JOHNSON lived on his farm. His chimney gradually became a hundred foot tunnel upward through the snow. His main reason for fire was to keep the chimney open, the blanket of snow forming adequate protection against the cold of the unusual winter. His stock was well cared for, though they lived in a darkness unbroken except when he came in with an oil lamp to feed and milk them. He passed the time working, reading and doing odd jobs of carpenter work. For thirty days he had talked to no one except his cows, horses and cat. On the first of February he heard a knocking under his floor. He threw aside the rug, and raised a trap door. Vanderbie came up through the hole.

"It has been a long time between drinks," exclaimed the old man, panting.

"It has," agreed Johnson. "Speaking of drinks, you look as though a little apple jack would help you. Have some. What is the news? Is the city taking a beating?"

The millionaire dropped into a rocking

chair, and drank the liquor without answering. At last he asked:

"Of course you knew about the trap door?"

"Certainly I did. I never commented on it because there seemed nothing to say. There seemed to be no doubt you placed it there for a reason, and I knew that when you were ready you would tell me what it was."

"I had a reason all right, but it was not connected with this snow storm. You see, I always felt that something would happen some day in New York. With a lot of people growing poorer and a lot of people growing richer all the time, there was bound to be trouble. I built this farm house and I built my office building, and from my penthouse I ran a stairway down through a steel tube. Only two openings to it. One in the penthouse and one in the farmhouse. If anything happened to the city, I was going to come here and live with you. I thought that the two of us could get along better than I could in the office building.

"I never thought of a storm like this. No one did. I bet even you never imagined that it would start snowing and never stop. All you said was that it was going to be a hard winter. I knew you would be all right, and so I stayed away from you and did what I could to help everybody. I am through now. I guess we are all through. The people who are still alive have given up hope. They are leaving the city, or trying to. From my penthouse I can see thousands of black specks moving slowly through the falling snow. In all directions you can see black lines, beaten paths with little dots on them, and those dots are all moving away from the city."

"What is the good of that? That is simply panic! Most of them will die in the open."

"That is the peculiar part of it. The

storm seems to be localized. Twenty miles from New York they have very little. Thirty miles away there seems to be almost a mild winter. I have not heard any news for days except over the radio, but it seems that the Government has not been idle. The entire wealth and man power of the nation is concentrated in a ring around New York. The people who can get out can be cared for in every way, but it is a physical impossibility to get supplies in to them. The Government has advised that the city must be emptied, but even there it admits its inability to do anything more than wait on the outside and care for those that can break through. Hundreds of thousands could have been saved if they had started to leave the city early in January. But nobody knew it was going to last. Now, when they do know, it is too late."

"How did they keep warm?"

"There were only two classes who did. The very poor and the very rich. The poor had stoves; they always did have stoves and they have kept the fires burning by tearing up their furniture, and finally the insides of their houses. Steps, partitions, doors. The very rich had fireplaces for ornament and pleasure and they have been burning up their furniture and their apartments, their books. But there were hundreds of thousands of people who got their heat through pipes from a central heating plant in the basement. All they knew about heating their homes was telephoning to a janitor they never saw to put on more steam in a furnace they never saw. They have suffered, because the janitors left their jobs, and, only in rare instances, was there anyone in an apartment house who knew how to keep a steam plant running, even if they had fuel to do it with. Of course, the fuel was soon used up, and you cannot heat an apartment house with a fire of books and furniture.

You need coal or oil. It was never cold, not real cold, but it was damp and dark, and I think that the death rate from pneumonia and influenza must have been very high.

"In the tall buildings the people who lived on the lower floors tried to move up. Naturally, the people who were up did not want them. I do not know the details, yet there must have been a million battles fought on the stairways of the city. But it is all over now. In another week the only ones left in this little old town will be those who are dead or dying."

JOHN JOHNSON rose from his chair and started to pace the floor. Back and forth and back and forth. At last he poured two glasses of the apple jack, handed one to his visitor, and started to drink the other.

"Snowing just over New York?" he asked.

"Yes, over a circle thirty miles in diameter. The further away you get from Broadway the less snow there is."

"What does the Weather Bureau say?"

"They say they do not understand it."

"Is that all?"

"That is all."

"Then I want to say this much. What I told you last fall was true. The signs I mentioned indicated a severe winter, but they had nothing to do with what has happened. I know something about the weather. Even took a special course in it during the four years I went to college. Those men down in Washington are covering up what they do know. This is not a usual storm. Out in the west, up in Alaska and Canada, they have unusual storms, blizzards, with snow piled fifty and sixty feet high in the drifts, but with the snow they have a very low temperature and they have wind. Here there has just been a

straight fall of snow. No wind, no zero weather. And a very mild winter all over the rest of the country, with hardly any snow. The snow that should have been scattered over the continent has fallen on one city, and it is the biggest, richest city of a big nation. I think I understand it, at least a part of it. This storm is not a natural one. It is not even a freakish one. Back of it is human intelligence. Someone is making it snow! Back of this natural phenomenon *stands some human intelligence!*"

Vanderbie looked at the farmer for some time before he reacted.

"I do not think so," he at last answered. "Once in a while things like this happened. How about the Ice Age? How about the time the earth shifted a little and the glaciers came down and tore the face of the earth and drove every living thing towards the Tropics?"

"That's true. But it happened slowly. For all we knew it took several centuries or more. Certainly not one month. You wait and see. Are you going to stay in New York? If you are, can you get some guns? Even if you are going to leave, I am going to stay and I want to be armed. Well armed. Rifles, elephant guns, machine guns, lots of ammunition, and even a small cannon. One or two of the French '75' variety would help."

"You are a dreamer, John. You need food, not guns. This is a problem for scientists, not soldiers. But if you want guns, I will get them for you. Anything you want. I did not tell you, but I have a broadcasting station, and it is still working. I can communicate with Washington."

"The last thing I would want would be publicity," said the farmer. "I have a feeling that it would do more harm than good. Do you really think the

city is going to be abandoned? Are you going to stay here?"

"There is no doubt about the city. Another week of snow and the place will be a cemetery. The Government is making every effort to empty it of every living soul. You cannot appreciate the way this is arousing the nation. But, no matter what happens, I am going to stay here. It is my home. I feel about this farm the way you would feel about your farm in Vermont. Besides, there is my little daughter. She wants to stay. Right now she is all alone in the penthouse."

"I never knew you had a daughter!" exclaimed the farmer.

"Lots of things you do not know about me. She is a nice little child, and I want to take care of her. I was one of the rich men in the United States, and you know what that means, as far as the fear of kidnapping goes. She and I are going to stay right here with you. Perhaps right here in this farmhouse, if you do not care."

"It is your house. I do not know how the little girl would like it. Rather dark here, but she could play with the cat," said the farmer.

"There would be lots of things for her to play with here. Of course, we can stay in the penthouse for a while. We will cross that bridge when we get to it. I must be going. Shall I tell the people in Washington anything?"

"Yes. Tell them that no matter what happens, no matter *what happens*, no matter *how unusual or unexpected*, to notify you and *leave us alone. Give us the news, but stay out of the city.*"

"I will do just that. But I think you are all wrong. This is a hard snow-storm, but it is a natural one. Back of it is some natural reaction of the elements."

He went down through the trap door. John Johnson closed it over him and

put the rug back. Then he sat before the fire, his chin in his cupped hands.

**T**OO many shadows here," he whispered to himself.

It snowed day and night for ten more days. By that time Vanderbie could look out of his penthouse on the twenty-fifth floor and see a field of snow before him.

Then Washington broadcasted to him in code.

He worked the message out, told his daughter that he was going to see Johnson, and started down the long circular stairs.

"It has come, John," he cried as he came through the trap door, "and it is either the work of a crank or you were right. Here is what I got today from Washington.

"Following message received at nine this morning. 'What we did to New York we can do to Philadelphia, Chicago, San Francisco, Panama Canal or Honolulu. Demand unconditional surrender and Government placed under our charge. Landing in New York March first. Any interference will mean destruction of all cities. Regret loss of life, but must have unconditional surrender of your government. If this message is not made public, it will show your acceptance of our terms.' What is your advice, Vanderbie?

Signed. Crowthers, President."

"I was right," cried the farmer. "Some one made it snow. I do not care who did it or how they did it, *they did it*. If the people of the United States hear of this, they will go mad, and that means their destruction. You must have the confidence of the President. Get word to him to keep that message quiet. It leaves me seventeen days to get busy. Those men, the ones who sent that message, are going

to be here on the first of March. They are going to come in some kind of air-craft, and it's dollars to doughnuts they are going to land right on top of this farm. It is the largest open space in the heart of the city. I am going to get ready for them. I am going to take my snow shoes, go with you to the pent house and beat it. It won't scare your daughter to see me bursting in, will it?"

"I guess not. I left her playing around the radio broadcasting room. She is a clever little thing with electricity."

Johnson suddenly shook his head.

"Won't do to have the two of you stay there. Stock has to be fed, chickens attended to, cat given her milk. You two had better come down here and look after them. Know how to milk?"

"The girl does. She spent last summer on a farm."

"That is fine. I would not want these animals to suffer. I have had the team of horses for five years. Dad cared for them when I went to college. I raised them from colts. You look after them and I will look after the people who sent that message. Let's go!"

**T**HREE days later Johnson arrived at Yale. Always popular, his arrival created a sensation. He went into conference with his old classmates, he located four men who had been on the 'Varsity football team. He held conference after conference. Five days later he went back to New York with one hundred Yale men. Every one had hunted big game; every one was big game himself. It was a personally hand-selected bunch of hard boiled, American sportsmen. And it was all done so quietly, so secretly, that few knew it was happening.

Twenty miles from New York they unloaded their supplies from trucks, loaded them on dog sleds, put on their snow shoes and started beating their way back to the old farm. It had been snow-



ing since the tenth, but only a little each day. They found the penthouse almost covered. Over the farm was a white field of snow, covered with crust. On all sides the tops of office buildings stuck their towers above the white sheet. They had less than a week to wait, less than seven days to prepare for their visitors. After a thorough survey of the situation they separated into small groups of five, each squad occupying the tower of one building. They had brought their own food with them. It is interesting to know that the plans Johnson made on his trip to Yale had gone through with very little change.

On the last day of February it stopped snowing and the sun shone for a few hours. The snow melted. That night the temperature dropped to zero and a thick crust formed over the old farm. Johnson held a final conference with Vanderbie, talked over final plans with his twenty lieutenants, fed his stock and went to bed. He was up at sunrise and went at once to see the newspaper man. He found him at a window of the penthouse.

"Send your little girl down to the farm house, and go yourself. No telling what kind of hell is going to break loose here today."

"I am not going!" declared the old man, as he almost lovingly fingered a rifle. "It is my city and it is my farm. You do not know it, but I used to hunt elephants in Africa. The girl can do as she pleases. You will find out some day that she is rather hard to boss."

"She certainly is, Mr. Johnson, and you might as well find that out now, as some time later. What do you think I spent that summer on the farm for? When Dad dies, that is going to be my farm, and I am not going to let anybody take it from me just by a threat."

The farmer turned around and faced a young woman. She was beautiful, but

determined, lovely, but there was a rifle in her hands.

"Who are you?" the farmer stammered.

"I am Mr. Vanderbie's daughter. The one he calls his little girl. I have been taking care of his broadcasting for him and in between times I have been milking your cows for you and feeding your cat."

The young man looked grim.

"I think I have met you before."

"You certainly did. It was at the Senior Prom the year you graduated. I was anxious to meet you, but when you talked about spending your life on a Vermont farm, I walked out on you. You told Dad about it and said that it made you so mad, that you went back to the farm and became a hermit. You told Dad all about it, but you had forgotten her name. But I never forgot you, though I have stayed away from you. You will have to admit that fact: Dad wanted me to meet you, but I knew how you felt about women; so, when you took charge of our old farm I just left you alone. That was O. K. with me, especially after I found out that there was no other woman trying to seduce you. So, I am going to stay right here. The cat might get hungry, the cows have to be milked, and you might get hurt or something like that."

"I have to be going, Mr. Vanderbie," cried the mad Yale man, "and when this is all over, you can get another farmer. I am through. Give your million to some one who appreciates it and your little girl."

AT ten that morning three airships came out of the clouds, sailed over the city and finally landed on the thick crust. They were large ships, something different from anything the hidden spectators had ever seen. Glistening metal with glass windows. Under perfect con-

trol they landed on the white, hard crust right over the farm, and in a few minutes doors opened and men came out and walked around the ships.

One minute passed and then five and then suddenly hell broke loose. From twenty office buildings French 75-mm guns poured shot after shot of high explosive shells on the three ships. Not one missed the mark. In ten minutes they were simply twisted masses of metal in flames. Men were running over the snow and now one hundred and two rifles in the hands of expert marksmen started in their work of death. An hour later everything was still, and the men of Yale poured out to finish the job.

One man out of all the men of the three air ships was alive and unwounded. All the rest were either dead or dying. He tried to kill himself but Johnson caught his arms just in time and carried him struggling to the penthouse.

"This is the end of the snowstorm," he yelled to Vanderbie.

"Looks like it," said the old man. "I am glad it is over and that the sun is shining, but I want a glass of your apple-jack more than anything else in the world. But I think that this man has something to say to us."

"Nothing to say," replied the Oriental, "except to ask your permission to kill myself. Under the code of my country there is nothing else for me to do."

"I will give you your choice," whispered Johnson. "You can decide on one of two things. Either I take you personally back to your country on an American warship, and the fleet will go with us, or you tell us just what happened to make it snow, and then you can have a few seconds alone with a loaded revolver. Make your decision and make it snappy. I have to go and look after my stock."

"There is not much to say," said the prisoner with a smile. "Since the last of

December the three airships you have just destroyed and the friends of mine you have just murdered have been in the stratosphere over New York City. In each ship there was a weather control. It is useless for you to ask me about that, because I am a soldier and not an inventor, and, if I were the man who invented the process, it would be useless anyway, because I would let you tear me to pieces before I gave away the secret. I can tell you this one thing. We were able to bring the snow from all over the United States and precipitate it on your city. We could make it snow or we could make it rain. We could make it sixty below zero or ninety above. So, we simply stayed up there and buried your city. Our government had nothing to do with it; at least, they would have had nothing to do with it, unless your government had surrendered. In other words, it was entirely a private enterprise, financed by private funds. The brains behind it lie scattered on the snow of your white city. Scientifically, we were absolutely correct, but we failed to consider certain human equations. Who could have told beforehand that the vaunted chivalry and humanitarian spirit of the Western World would have shot us down like so many wild animals without giving us warning? without giving us at least a fighting chance for our lives?"

Vanderbie looked at him in astonishment, too overcome with anger and emotion to speak, but John Johnson, the Vermont farmer, had no hesitation in assuming the lead.

"Perhaps we were somewhat atavistic, somewhat savage in doing as we did, but we had at least a degree of provocation. In the few minutes of life remaining to you, think of the thousands of women and children you have scientifically murdered. Think of the millions of dollars of damage you have scientifically

caused the nation. Perhaps you were prompted by a fine national spirit, but so were we. We are Americans. We take things standing up, face to the danger. When you play poker, you want to be fairly sure that you hold a stronger hand than the people you play against, before you make your bet. I could torture you to make you tell me more, but I have made my promise and I will keep it. Here is a revolver, and you can go into the next room. Knowing your nation as I do, I have no doubt that you will know what to do with it. You may be a brave man. In fact, I think you are a very brave man, but you have lost your bet."

The Oriental took the weapon, bowed deep, walked slowly into the next room and shut the door.

A few seconds later a sharp explosion told of the end of the poker game.

"I wish," commented Vanderbie, "that I had a glass of your apple jack. What is to be done next, Johnson?"

"A very important thing. Have the best scientists in the nation rushed here to go over what is left of those air ships. They may be able to learn some of the secrets which made this thing possible. That is the first thing and it should be done at once. Then it is going to be spring-time soon. It is hard to imagine what that will mean, with two hundred feet of snow in the streets of New York. Of course, it will melt, but I think that the city will have to be dug out. That is a job for the nation. The whole thing is a mess. There must be thousands of homes destroyed, and tens of thousands of people dead, in their cellars, in apartments, on the snow, in the snow. When the flood comes, part of what is left will be ruined by the water. But we are a big nation and a rich one. Out of the ruins will rise a better and a healthier city, perhaps one with the slum, the band-box districts replaced

by parks, breathing places for the little children. Personally I am going to disband my little army with thanks and go to see the President of this country as soon as I can. You attend to the other details. Be sure to have my stock attended to, and the jug of apple cider is in the closet on the left of the fire place on the top shelf."

A DAY later Johnson, the farmer, talked to Crowthers, the President, who had the ability to listen to the entire story, for over an hour without a single interruption. Johnson ended:

"And now it is all over, Mr. President. This thing has happened before and it will happen again. In the old days two men settled their disputes with stone axes. The battle of Hastings must have sounded like a boiler factory. Now science directs warfare. The battles of the future will be battles of brains instead of muscle. But there are going to be more wars. Just as long as men are men there will be more wars. The side with the better brains will win. Perhaps the side with the better intelligence will be able to keep out of war. I think that I would advise a complete ignoring of the entire affair. I would even have the bodies embalmed and sent home with an escort of honor. But do not show resentment, don't rush into a war. Instead, start the scientists of this country to work. If inventions like that can be discovered on one side of the world they can be discovered on the other side. If this invention was properly handled, it would turn the United States into a paradise. It would mean the end of devastating droughts, the end of floods, the end of terrible blizzards. Weather control! Think what it would mean for agriculture. It would make our deserts blossom and our waste places turn into forests. Turn instruments of destruction into blessings for our people."

"You are right!" commented the President. "How should you like to stay here in Washington and direct the program? We need a man like you."

"No! For months I have been running a farm show for your friend, Vanderbie. I am sick of publicity. I am going back to Vermont. Sap is running in the maples and it's sugar time in the Green Mountains. Come up and see me some time. I have a dandy log, big enough for two men to sit on and watch the shadows. This shadow that has fallen on the nation was a deep one, but the sun is working overhead now, and I think that there won't be so dark a shadow from now on. Good-bye, and good luck. You have a lot of work to do before New York is cleaned up. But try to keep it a white city from now on. It certainly was a pretty sight to see all that snow with the sun shining on it."

Johnson sent a message to Vanderbie.

"Am going back to Vermont. As soon as you can, send my stock back home, if they are still alive. You get some other fool farmer to run your farm show for you. It was a fairly nice place to live in, but I know of a better one. Be sure to see that the cows are milked and the cat fed."

Vanderbie showed the message to his daughter, with a frown.

"He hasn't any pride!" he commented. "He could be one of the big men of the nation and he is just going back to a Vermont farm, content to sit on a log and watch the shadows."

"I suppose so," sighed the daughter. "You put a good man down there under the snow and have his pets cared for. I am going over to Paris."

"Paris?"

"Yes, I haven't got a thing to wear."

Vanderbie sent a veterinarian down to his farm.

"Save every living thing you can!"

he ordered. "Put some sun-ray lamps down there and keep those cows and horses healthy. I do not know how long it will be before we can dig them out, but till they are back on Johnson's farm you have a job with a good salary. He is proud of those animals and nothing will give me more pleasure than to get them back to him alive and well."

A YEAR later it was spring time in Vermont. The team of horses, the cows, chickens, pigs and cat, the sheep, even a few ground hogs were safely domiciled on Johnson's farm. The maple sugar was made and for a little while the farmer had little to do except the routine chores, and watching the shadows. Near the log some skunk cabbage was bursting out of the ground, the first sign of real spring.

A rather unusual shadow fell across the ground. He looked up and there was Rose Vanderbie. The farmer frowned. The woman sat down on the log beside him without waiting for an invitation.

"Father and I came up here to see you," she explained. "We have been looking over the house and barn, and I must say that you have a sweet little home here. You have enough water power in the stream to make your own electricity, and that and a few other things would make the farm complete. But you do need a wife!"

He shook his head.

"I may need a wife, Rose Vanderbie, but not the kind you would make. You are too accustomed to pushing electric buttons and having work made easy for you. You are the kind of modern woman who does not even know how to cut bread. You buy it already sliced. I should think that your father should know better than to have brought you with him."

"He did not want to. He said it was useless. He thinks he knows all about

"you. But he doesn't. No man really understands another man. After you left New York I went over to Paris and bought some clothes. I really had nothing to wear, certainly nothing to get married in. And I visited the best farms in France and England. I even brought some stock back with me. And now I am here, with my clothes and my stock and my father and my preacher to marry me. I am going to stay!"

"No! I am going to have your father

spank you and take you back to New York City. I have enough shadows here on the farm without having yours."

"It will be a nice shadow, John, and after you get used to it, you will be lost without it. Come on up to the house. The preacher has to get back to New York, and I left Dad cooking the dinner, but he has had two drinks of apple-jack, and by this time he may be so happy that he will make a mess out of the biscuits."

### THE END

## The Temperature of Space

There has been much discussion about the temperature of the outer layers of the atmosphere. If we consider space as being vacuum without any gas, then there is nothing there to be hot or cold. The letter given below from Dr. Donald H. Menzel of the Harvard College Observatory, is of great interest in this connection. It is in response to an inquiry from the Editor of this magazine.

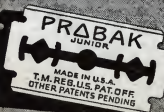
Strictly speaking, it is very difficult to define the temperature of the upper atmosphere. One will obtain various results depending upon the methods of measurement. If one accepts the ordinary definition of temperature, namely the reading of a black-bulb thermometer at the particular level, the reading would undoubtedly be quite low, probably well below zero. The Smithsonian Physical Tables give a value of

approximately minus 57 degrees centigrade for the stratosphere, in the winter and minus 51 degrees centigrade in the summer.

There are, however, other methods of measuring temperature and these give discordant results. The spectrum of the night sky shows a large number of bands, due in part to nitrogen and one can, from a study of the intensities in these bands determine the temperature appropriate to the excitation of the nitrogen molecule. It is this temperature that is much higher. It is not the kinetic temperature of the moving molecule, but probably is related to the temperature of the radiation that excites the nitrogen molecules or to the mean velocities of the electrons that excite them. It is not certain which mode of excitation is prevalent. I, myself, incline toward the latter.

Donald H. Menzel, Ph.D.

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# Liners of Time

By JOHN RUSSELL FEARN

*The comments preceding this story leave nothing to the editors to say in introducing it to the readers. It is sufficient for us to say that Mr. Fearn is a favorite with our readers and it is interesting to be able to give stories by an English writer.*

## Introduction

THIS manuscript, sent to you via the Time Line from 2000 A.D., will, I know, present many bizarre aspects and situations, but I have at least the consolation of knowing two indisputable facts. One is that I have spoken the truth and related to the best of my ability the history of an adventure; and the other is that my work will be read and analyzed by broad minds that are capable of seeing further than the first street corner they are coming to. For this latter reason, knowing the intense criticism the most intelligent of the readers will direct upon this history of an adventure, I feel it my duty to make clear, before I commence the real narrative, one or two points about Time, from the viewpoint of a Pilot of Time—for such I am.

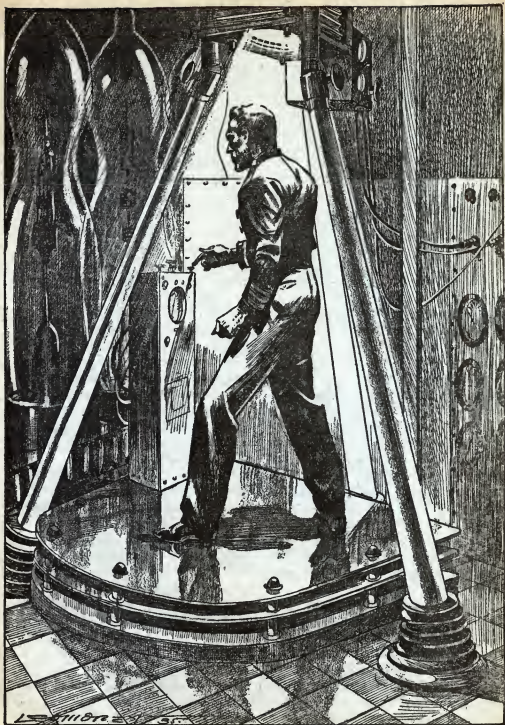
One fact about Time is that, although you can equally move to past or future, you cannot possibly, in either of the two states, do anything but what you did or will do in one of the states of Time. And further, it is *impossible* to live in any of the Times States, after your birth, without doing exactly what you had already done. Time cannot be altered. But it is possible, I have found, to go any distance *before* your birth and live in the past. Should you return to that same point in the past, once again

you would, as I have said, perform the same actions, because a man or woman cannot do two different things in the same period of time. . . .

The sharply critical amongst you will ask many questions as you read my history. At the point where my companion, Elna Folson and I, are flung back into pre-history, you might ask (upon our return) why not go back again to the same place and see once more the wondrous Intelligences we discovered there. The reason why not is because we would only live over again the same experiences. . . . Hence my little explanation.

Another point. In my struggles with Elnek Jelfel, of which you will read, you will ask why I always arrived *late enough* in the passage of events to take up the thread of my experiences and make them continuous. I have merely put this for simplicity. Several times in actuality I overshot the period and came back to the beginning of my experiences, only to do the same actions all over again; but since the repetition is of no interest, I have deleted it, of course. . . .

I have found in Time that Time is always as writ. You cannot alter it. You will do in your lifetime what Time has planned you shall do, and no matter how far you may reach ahead, or delve backwards, you will inevitably be



*Switching on the power, as I had seen Jelfel do it, I put myself in the full intensity of that beam, enlarging my size gradually until I stood quite fourteen feet tall.*

brought to obey immutable law closely.

And now, my friends of the past, I leave you to criticise and dissect my history of an actual experience. . . . Thank you.

Sandford Lee,  
(Master Pilot of Liner 48)  
New York,  
2,000 A.D.

## Part I

### CHAPTER I

**T**HE President of the Time Liner Corporation requests your presence in the Debating Room at the eleventh hour."

The cold, implacable, mechanical voice ceased to speak from my Recorder, and was followed by the metallic twang that pronounced the breaking of the electric contact between my flat and Headquarters.

With a puzzled frown I sat for a while looking at the orifice of the instrument, then, with a shrug I rose to my feet. In the days of 2000 it is the duty of any employee of the Time Liner Corporation to obey commands without question. The organization controlling the great company was ruthless and commercial, demanding absolute compliance with all orders, from the highest to the lowest. Even I, Sandford Lee, Master Pilot of Time Liner 48, was permitted no variance from law, despite my relatively high position.

I glanced at the impulse-clock upon the wall; it was ten minutes to eleven. Still a trifle puzzled by the order, I buttoned up my uniform and slowly ascended the stairs to the glider-roof of my flat. I pulled forth my glider from its little shelter, clambered in, and in another moment was sweeping down the tilting chute, lunging into the full depth of the glider atmosphere. For those of you who may not understand this, I

had better mention that in 1978 a genius named Carelli discovered that charging certain layers of the upper atmosphere with a gas named tonium—several times lighter than hydrogen—made flying absolutely safe, whether it be glider or flying machine. A fall to earth was impossible except by actual collapse of the machine being flown, which of course was an unheard-of occurrence.

Headquarters—the mighty building of the Time Liner Corporation—lay perhaps two miles to the south, and despite the hour the glider ways were not particularly busy. I alighted on the Headquarters' roof-landing about ten minutes later, and Hensen, a sentry whom I knew very well, saluted smartly. I returned it, and made my way downstairs to the lower floors via elevator and percussion staircase—a system of suspended gravitation by which one is gently lowered down slopes of great slant, thereby obviating staircases. In the gleaming passage-way of the main entrance to the Debating Room I was met by two guards, bearing the official insignia of the T.L.C. embroidered in gold upon their uniforms.

In silence I was ushered into the Debating Room, and, as I saluted and stood respectfully at attention, I noted the details already familiar to me—the horse-shoe table with the Directors of the Corporation seated at it, and the walls lined with instruments. The bright morning sunlight slanted across upon me from the vast glass windows and picked me out like a solitary figure.

"Commander Sandford Lee?" Templeton, the President asked, merely as a matter of routine.

"At your service, sir," I replied quietly, and waited for the next.

"We have summoned you this morning, Commander Lee, for a very special purpose. As our most experienced engineer and pilot we feel that you—and you

alone—will be able to bring to an end an alarming state of affairs existing with our Time Liners."

I waited in silence, though I had an idea of what he was hinting at.

"Recently, Lee—commencing I believe about four months ago, our liners began to disappear—and all our efforts to locate them or the passengers and crew have completely failed! There are only two alternatives to be admitted. Either those liners have been turned aside from the time line by some colossal and unsuspected power, or else they have been flung beyond the Limited Stop—the year Ten Million and Two Thousand. If that be so, if the latter is the case, those liners are marooned in far futurity and lost!" Templeton's jaw set and his eyes turned to me interrogatively.

I took a step forward. "Of course, sir, I have heard of these happenings, but I never suspected matters were so serious. Three of our liners have gone, I know. That means nearly fifteen hundred lives. . . ."

"Exactly," Templeton nodded grimly. "Of course, we have had the vibration detectors at work; we have used the time radio-tester; we have even sent out scout time machines, but they have never returned." Templeton paused and then thumped his fist down on the shining table top. "Lee, it is up to you! To-morrow Liner 16 should leave New York for the year 40,000. Instead, you will take Liner 48, your own ship. It is more fully equipped than any other ship in our fleet, and is therefore more able to cope with danger than one of the earlier types. At all costs, Lee, you are either to rout this unknown menace, or else find the cause of it, when plans can be made for its removal. . . . That is all."

"Very good, sir." I saluted, and left the vast room. In the passage I paused and considered: fortunately I was ac-

customed to receiving imperative orders at very short notice. Accordingly, I decided not to return to my flat immediately, but to settle my affairs in the city before departure. With this in my mind, I turned and descended to the lower levels, finally along the moving passageway, and so into the street.

I SUPPOSE the street, of the year 2000, would appear to you of the past a bizarre and very grotesque affair. To me it was commonplace. The gasoline car, for instance, went out of existence in the year 1970, and in its place came the remote-controlled car. The driver, of course, guided and braked his own conveyance, but the motive power came from a centrally situated power-station. This station used solar energy, converted into electricity, which in turn was transmitted on invisible beams to the magnetic propulsion motor in the car's interior. Each car owner, therefore, paid a yearly subscription—or tax—to the Solar Energy Company for his power, and his engine was immediately linked up.

Buildings in 2,000 were not so greatly altered, save for the fact that all roofs were sheathed in lead of four-foot thickness. This, be it understood, was to block the very short wave cosmic ray. Petard, as far back as 1948, discovered that this emanation was the main cause of human life becoming shorter, and the only effective blocking to the rays is, of course, lead. The results, it appears, have been very beneficial. . . . But, however, I digress from my narrative.

I was turning into the main street when I almost collided with Elna Folsom. It may seem strange to you, but Elna was approximately eighteen thousand years older than I, and yet, by the same paradoxical situation, was about my own age—thirty. Those of you who

might expect Elna to be some astounding-looking creature, due to the time of her birth, will be disappointed by my description. For she looked very much as the earlier beings have done.

About five feet eight inches tall, she was dressed, not in some bizarre outfit, but a neat cream-colored costume, cream stockings, fairly flat black shoes, and a wide-brimmed hat. If you had met her in the twentieth century you would have noticed little difference in her attire, from that to which you were already accustomed. The only change lay in her features. They were a trifle more regular than the earlier types, and the teeth were far more perfect than any of her twentieth-century sisters. There was, too, a keen and brilliant intelligence in the gray eyes, and an air of independence and resolution, entirely lacking in the prototypes.

Elna and I were just very good friends. Such things as love were unknown in 2,000, or in any of the Ages coming after it. A man and a woman could be good friends without infringing any laws, so closely equal had the sexes become.

As Elna was the daughter of the President of the Time Liner Corporation in the year 20,000 (her own year), she was a girl of more than average intellect and considerable wealth. I would make it clear here that the Time Liner Corporation had branches in all Ages. The one in 2,000 was the acknowledged head office, but none the less important was the one in 20,000, over which President Folson held sway. The two Presidents—Templeton and Folson—were indeed the only men in the whole timeline who knew the real secret of a time-liner and how it operated. They alone could construct a time-liner from the original plans.

"Why, Sandy!" Elna exclaimed in delight, using my nickname, "I was just

wondering whether I would call at your flat or not. You see, I'm leaving to-morrow for home, on Liner 16. I'm not quite sure of the formalities, despite the times I've had vacations from my own Age, and I was thinking of looking you up to get matters in order."

I smiled and took her arm. Together we walked along the street.

"I don't think that you're going to leave by Liner 16," I said quietly.

"Oh, why not?" Her gray eyes were looking at me in pleasing enquiry.

"Because, Elna, Liner 16 isn't leaving to-morrow. I've just come from Headquarters now. I'm taking to-morrow's load, on Liner 48."

"You are! Taking that luxury liner! Oh, I shall feel so—confident."

"That's sweet of you, Elna, but I'm afraid this trip is to be more a matter of grim business than any trip before. There's dirty work going on somewhere in the Time Line, and I've been assigned to locate it. Frankly, I don't half like you coming on this trip. There's going to be trouble, I'm afraid."

"Rubbish!" she pouted. "Who cares for a few mysteries in your old Time Lines? The trip will be as safe as any other—"

"Safe!" I laughed a trifle harshly, and then proceeded to explain to her all the President had told me. Even then she seemed only a trifle abashed. It takes a lot to upset the courage of a strong-minded young woman of 20,000.

"You tell me that either these precious liners of yours have gone so far into the future that they can't get back—or else they are perhaps marooned in some hyperspace, in some other dimension. You expect me to understand it! Sandy, I haven't the slightest conception of what you're talking about."

"And to think you are eighteen thousand years older than I!" I said solemnly.



She laughed and revealed those magnificent even rows of snow white teeth.

"It isn't altogether that I don't understand," she amended. "It's more, shall I say, lack of the necessary imagination—or instruction. Nobody has ever yet made the system of time travel clear to me, perhaps because they don't understand it. It is very wonderful, I know, this travelling between time stations like one used to do in an old railway train, but still I do not fully comprehend it."

I paused as we passed an automatic dinner service. With a nod she assented to my enquiring look and we passed inside. A courteous robot ushered us to our tables and placed the electric menu before us. We surveyed it, chose our requirements, and then pressed the corresponding buttons arranged at the side of the menu. Instantly the table top turned over and there was our meal upon metal plates. This "turnover" was effected by tremendous centrifugal force which naturally prevented the viands from hurtling off. I would mention here that the idea of tabloid food had never really attracted anybody, and the food of 2,000 was about the same as it had always been, save for the fact that there were many cultured, delicious dishes from future ages.

"**N**OW," Elna said, when we were comfortably seated, "be a good sort and tell me all about this awfully difficult time business you specialize in."

"If I specialized in it I wouldn't merely be a pilot," I grunted. "I'm not genius enough to fully comprehend it, but I can outline it enough to make the idea clear to you. Listen carefully."

"All right; carry on," she invited brightly, and ate silently as I explained.

"The method of time-travel was discovered after years of research by that wonderful electrical analyst, Ino Car-

reno, in the year 1980—only twenty years ago. He tried every conceivable method of solving time, having a fortune to do it with and more than his share of brains and ingenuity. He tried everything from a cinematograph film (which he decided was time in analogy) to radio waves. It was, however, his researches in the field of radio that finally enabled him to solve the problem of time travel. As you will be aware, in olden days when radio was in its infancy, radio waves were subjected to extreme distortion and fading, particularly below the 500 meter band. On very short waves the trouble was even more apparent. Several well-thought out theories were advanced as to the cause—such as the deflecting of radio waves from the earth; or the 'throw-back' from the Kennelly Heaviside Layer. All this, however, failed to satisfy Carreno, and he explored the problem thoroughly, taking radio waves alone, as distinct from television waves. . . ."

"Are you discussing time or wireless?" Elna asked me, with a sly smile, bisecting a bun very neatly.

"I'm coming to the point," I answered patiently. "Carreno's experiments were numerous, but they eventually brought to light the fact that a tenuous, invisible gas, entirely unknown before, existed in bands about the earth—and probably embraced the whole universe; he had no means of testing the latter possibility. Now, this gas, he discovered, was denser in some places than in others, and was very highly ionized, probably by cosmic rays. This instantly accounted for the fading in radio-waves, and occasional spells of static, that made radio impossible. Plainly then, contrary to old-time theory, the Kennelly Heaviside Layer was not responsible. You understand, Elna, that static is caused by the free movement of protons and electrons, impinging upon one another, the atoms hav-

ing been wrenched loose in their components.

"I'll take your word for it, Sandy," she replied, a trifle discouragingly.

"Well, this gas fascinated Carreno. He called it carrenium. At length he managed to construct a small model made of what he called his carrenium alloy. This metal was lighter than the gas, and floated upon it—apparently in mid-air. Carreno, it is reported, only saw the model for a second, then it vanished from sight."

Elna laid down her knife. "And to think intoxicants went out before Carreno was born!" she said irrelevantly. Then with a laugh. "But go on. I'm only joking."

"Puzzled, Carreno buried himself for months in calculations and at last found that the strange gas had two distinct properties. One was that it promoted growth in living organisms by speeding up the action of the cells. This he discovered by 'bottling' some of the gas and testing its effects upon animals. The second property was that it moved with a stupendous velocity parallel to our three-dimensional plane. The gas, in truth, was allied to, but was not actually, the fourth-dimension."

"It was not really the fourth dimension?" Elna repeated thoughtfully. "It was allied to it?"

"Exactly. It lay, to be exact, diagonal to the three-dimensioned plane that we understand. But to resume: Carreno finally projected himself into the gas in a life-size machine. He utilized the gas itself for propulsion—which system, by the way, I'll show you some day on a time liner. Instantly, Carreno found himself the astounded observer of a four dimensional universe, with all the ages of time from dawn to infinity unrolling before his gaze, like some mad jig-saw puzzle, as the vastly accelerated speed of the gas—in proportion to

normal time—bore him onwards. He came back and summed up his conclusions, which he published, and which you may see in the museum any time you wish. It was once his workshop.

"His conclusions were that the general distribution of the gas throughout the ages had caused Man's gradual evolution, and evolution is, of course, time. Normally, the gas would evolve man further and further into future time, by degrees—but Carreno's discovery revealed that time is purely a mental construction, caused by Man's undeveloped senses. Projection into the actual gas of evolution made it possible for Man to race far ahead of his own Age, into the distant future, or force his way back along the time line to the past. So the thing went on. For a further test he built a life-sized machine and sent it back into the far past, empty. Of course it never returned—but unhappily he made the mistake of his life when he did that. That time machine had an accelerator attached to it, which withheld the power of speeding-up a time machine's speed to five times what we can get now. An average time liner to-day moves at a speed of 6 years to the minute. If only that accelerator could be discovered again it would increase our speed tremendously."

"But surely Carreno took notes of his work?" Elna asked in surprise.

"Yes, but unfortunately the details of his wonderful accelerator were never recorded, for the simple reason that two hours after he sent that machine into the past—the only machine ever made with an accelerator—he collapsed from heart-failure and died without leaving a single workable detail. All that remained was the secret of time travel, and out of that was born that mighty Time Liner Corporation. Carreno's workshop in the center of the city, as you know, stands now as it stood then, and

has become a museum in his memory."

Elna had lost her flippancy as I concluded.

"A wonderful man," she said thoughtfully.

"A genius," said I. "Perhaps, if you insist coming on this trip to-morrow, you will be interested to see some of the inner workings of a time liner."

"I should love it!" she answered eagerly; then pensively again, "Sandy, why do different Ages have different names? For instance, my own Age is called The Age of Security. Then there is the Age of Danger, and so forth. Why? Do you know?"

"Yes. For instance, if a man of 2,000 desires important information he takes the Liner to the Age of Intelligence. If, on the other hand, a man of the Age of Intelligence desires a relaxation, he goes to the Age of Contentment. Or, if a man of Contentment desires excitement, he goes to the Age of Danger, and so on. Time has become utilized merely for the extension of achievement, and the different ages of advancement or in some case retrogression—are defined as Ages. You might as well ask why a train used to travel between New York and California in the old days."

"I see. Thanks, Sandy."

We turned back again to our meal, which had been neglected during my lengthy, and I fear a trifle faulty exposition on Carreno's time-travelling method—but had barely commenced when a slim, pale-skinned man, attired in a close-fitting, black, one-piece suit and flowing cape entered, black hat in hand. As he came by our table he paused and bowed to Elna. She returned the salutation and I rose to my feet.

"Oh—er—Master Jelfel," she said, detaining him. "Just a moment."

He came back again, and somehow I took an instant dislike to his pale, cruel face and deeply set, startlingly

green eyes. His teeth shone in a smile of welcome.

"A request from you, Miss Folson, the daughter of the Time Corporation President, is tantamount to a command," he murmured, and bowed his coal black hair towards me.

Elna was not in the least embarrassed by his silvery effusions. As usual she rose in almost regal grandeur to her feet, collected and practical.

"Sandy, I want you to meet Elnek Jelfel, Master of the Age of Problems," she said quietly. "Elnek Jelfel, meet Commander Sandford Lee, chief pilot of Liner 48."

"And so one honor is merged into two," Jelfel said, in his strange, faintly metallic voice, and shook my hand with one that was strangely bony and ice-cold. "Indeed it is an honor to meet the pilot of so wonderful a contrivance as a time liner!"

I fancied I detected a slight sarcasm in that remark, and bowed stiffly.

Jelfel hesitated before saying something; then he turned to Elna again.

"Perhaps I may have the pleasure of seeing you once more upon your return to your own Age to-morrow?" he asked smoothly.

Elna's eyes indicated her mystification. "How did you know I was going?" she asked in surprise.

The Master laughed, half to himself. "There are many things in the Age of Problems that others know nothing of," he answered enigmatically. "For the time being, Miss Folson—and, of course, my dear Commander Lee—I will say farewell."

He bowed again and then retired to a distant table to commence a meal.

As we resumed our seats I cocked an eye on Elna and she looked at me doubtfully.

"I met him on the liner whilst coming here from my own Age," she explained.

"He was very pleasant, and naturally I saw nothing wrong in talking to him. He even took a photograph of me. I've seen him twice, since I've been in 2,000, purely by chance I suppose. He told me that this was his first trip from his own Age, and he was finding it very instructive."

I grunted. "I don't like the look of him, Elna. His green eyes are fishy, and his manner is altogether too polished to be genuine. He's up to something, and I don't like you being involved in it, either. So he belongs to the Age of Problems, does he? That's—let me see—about the year 22,000, two thousand years after your own Age, and nearly at the end of the trip to 40,000. The Age of Problems. . . ." I mused for a moment, odd thoughts in my mind. Elna watched him intently.

"Well, what's the trouble?" she asked presently, as I remained silent.

"A MYSTERY of decided proportions," I answered her. "The Age of Problems is the Age we always miss on the time-journey. It's shielded by something peculiar which nothing can penetrate. That is why we call it the Age of Problems; it contains a deep and peculiar mystery. A view of the closing chapters of the Age of Problems reveals a charred and blackened landscape from which all life has been burnt out and blistered, as though by a colossal fire. The one Age we never stop at, because it is unexplainable—and yet, Elna, here is Elnak Jelfel, from that very Age! How did he ever get aboard a time-liner?"

Her gray eyes became frankly puzzled. She pulled down her lower lip reflectively.

"Do you know, Sandy, I never thought of that," she admitted presently. "It is a mystery, isn't it?"

"More of a mystery than I care to

admit. True, he might have gone forward or backward in time far enough to get to another age and board a liner—But no! That cannot be the explanation. He would have to take a liner to do that, and they never stop at the Age of Problems. . . . Elna, I don't like it."

"It is peculiar," she said thoughtfully, watching the distant Jelfel from under the shield of her hat brim. "He's a queer looking man, too."

"Well, we can't do anything by conjecture," I said with sudden philosophy. "We had better be getting away; the dinner rush is on."

She nodded and rose to her feet. I paid the electric menu, then we strolled to the door and out into the street. Here Elna paused and turned to me.

"Well, Sandy, I've my passport to get arranged," she said, "and then I've all my packing to supervise, so I think we'd better call it to-morrow at nine A. M., eh? That's when we start, isn't it?"

I nodded. "All right then, Elna—see you in the morning, and then I'll show you 'round if I can get the opportunity. Good-bye."

We took leave of each other, and left to myself I thought deeply as I walked along the busy pedestrian-ways. I could not for the life of me understand the curious acquaintanceship between Elna and the suave, cruelly-disposed Master of the Age of Problems. Elna, as a rule, was a sensible and discerning girl—a perfect product of her advanced age—so naturally I felt a trifle perturbed at the easy manner in which Jelfel seemed to have won over her feelings towards him.

The more I thought, the more perplexed I became; but presently I had to shelve my thoughts and theories as I became involved in the business problems of the last rushed hours.

## CHAPTER II

## Into Time

AT eight-thirty the following morning I arrived with my usual equipment at the Time Liner base. As was customary, everything was bustle and activity along the entry platforms. Loud-voiced officials were shouting instructions and directions through high-powered amplifiers; automatic chutes were conveying luggage and personal belongings into the liner's storage chambers; technicians were busy with the almost incomprehensible mass of complication that was necessary to project the mighty eight-hundred-foot-long liner into the time line.

At the bottom of the main entry platform I met Elna. She took my arm and we went aboard together. At the door of her suite I paused.

"I'll see you in about half-an-hour," I promised her. "Then I'll show you around a little." She nodded acquiescence, and I turned to go. Then I hesitated and frowned as I beheld the slim, immobile figure of Jelfel a little way along the main deck. He was leaning against the open air-lock, gazing out at the seething activity outside. My course to the control room took me past him, and as I did so he turned leisurely, and recognizing me, bowed.

"Good morning, Commander," he said calmly, his deep green eyes upon me.

"I regret my salutations are brief, Master Jelfel, but urgency demands that I leave you," I returned shortly, and, with a curt salute, I strode on toward my own domain, oddly irritated by the fellow's presence. I felt that he was a bad omen.

As I entered the main control room Sub-Engineer Aldbury saluted and advanced.

"All set, sir," he said. "We've ten minutes to pass before leaving. We've

got those Vibrators fixed up as you requested."

"Did they show anything?" I asked shortly.

"Yes, sir. The readings show that the time line is clear all right up to the Ten Million Mark, but there are queer little disturbances around the Age of Problems."

"Oh!" The memory of Jelfel flashed into my mind. "What sort of disturbances?"

"Well, there's some queer behaviour on the part of the atoms composing the time line. Looks as though they've been pushed to one side, or something. Have a look, sir—I don't quite fathom it myself."

I crossed over to the Vibrator, similar in every respect to the instrument used by the testing department at Headquarters, and looked at the recording needle keenly.

Upon a long sheet of parchment the path the liner would take through time was scale-drawn, with the various Ages marked at the correct points. The Vibrator, in effect, was something like a "stationary" time-machine. That is to say, it sent forth a beam of pure energy, allied to positive electricity, along the time-line. This energy beam had a fading point set at infinity, so that it lost nothing by radiation during its travels. Some wit had called the instrument "The time-machine's Ghost!" for the simple reason that whilst the Vibrator projector itself was firmly imbedded in 2,000—or any other age, if desired—the beam itself went onwards to futurity or prehistory, as the case might demand. In this case it was the former, of course.

The energy of the beam, therefore, if it struck anything unusual in its course along the time line, was repulsed slightly, and the effect instantly recorded upon the chart. This repulsion



caused powerful springs to move backwards in the projector, which in turn deflected the delicate tracery needle on the chart. Naturally, the result looked something like an old-time seismograph record, only that the line was usually perfectly straight. I saw now, however, that noticeable zig-zag deviation occurring exactly at the spot 22,000, designated as the Age of Problems.

"From the look of that line," I said, turning to the watching Aldbury, "I should say that a beam or something is being projected from the Age of Problems, or from its area. The energy of our projector beam is positive electricity—that beam from 22,000 is perhaps also positive electricity. Positive always repels positive, and if sufficiently powerful it could blow this time liner completely to one side—blow it to pieces! I don't like the looks of it, Aldbury."

"Neither do I, sir. What are we to do? Not make the journey?"

"We can't stop now," I answered. "Keep on until we approach more closely to the disturbance; then I'll give orders as to what is to be done. I have an idea that one of the passengers can explain this."

Aldbury looked at me in astonishment. "One of the passengers, sir?"

"Yes. There is a man aboard who is the Master of the Age of Problems; I have an idea he might be able to explain this."

"But, sir—" Aldbury stopped in mid-sentence as the warning gong sounded on the wall. Without another word he turned away to his post with that incontinent obedience to duty that is a byword with a time liner employee. I took one last mystified look at the Vibrator, then, mentally resolving to see Jelfel at a later date, I too turned to my controls, issuing instructions through the radio-phone.

"Close the outer doors! Stand by there with the repellers! Throw on the lead shields!"

This latter order, by the way, concerned the movable lead sheathing with which all time liners were equipped, in exactly the same manner as all buildings. In the time line, of course, cosmic rays were exceptionally prevalent and the lead sheathing was our safeguard.

I watched the exterior workers through the televisor, and presently Chief Engineer Caldon raised his hand in readiness.

"O. K!" I said sharply, and threw over the master-switch of the repulsion generators. Again I must digress for explanation's sake; I am inclined to forget you know nothing of operating a time liner.

The gas Carrenium was drawn through powerful suction engines into sealed tanks and remained there under "movable" pressure. This gas pressure was transmitted to pistons at either the front or the rear of the liner (as our way of travel demanded). At the extremities of these mighty pistons were affixed objects that I can only assimilate to immense plungers—great round disks of a rubbery consistency and yet enormous toughness, which had the power of pushing upon the gas stream itself and so moving the vessel forward, much the same as oars move a rowing boat. Our fuel, therefore, cost us nothing, as we merely used the contents of the time stream itself. The greatest cost to the Corporation lay in the upkeep of the sealing tanks and repellers.

At my order of "O. K." the exterior repellers got to work. The time-liner had been lying on a cradle of metal plates. Actually, these plates were energized, containing enough elec-

tric current to hold the time liner to their surfaces until the contact was broken. I have mentioned that the liners were made of an alloy much lighter than the time gas: this alloy, even when sheathed in lead, still floated with the same perfect simplicity. The only thing to anchor the vessel was, therefore, magnetism, of a quality capable of holding the alloy immovable.

The repellers, therefore, once the current was broken, permitted the vessel to move upwards and diagonally. The outcome of this was to drop the vessel into the time line, and also allow it to float in the air, and thus save the possible materialization under an ocean or inside a solid body at some point in the future. Not that this was likely to happen, for the future was perfectly mapped out—but caution was never overlooked. . . . . Another detail too was the terrestrial gravitator, by which, as the passage through time went on, the liner kept constantly in the same position in relation to the earth as the planet moved on in its orbit—otherwise we very probably would have been left in the void.

I waited intently at my controls until I felt the slight jolt that announced the impingement of the liner with the time line. Looking through the observation window I saw the crowds on the departure platform waving and cheering vociferously as we moved away from them; then suddenly they commenced to fade, and for an instant I had the familiar vision of seeing them merge peculiarly into a square transparency; they seemed oddly bisected by cubes and oblongs, as for a moment I caught a glimpse of them subtended into the fourth dimension.

The view, from then on, was one with which I was well acquainted, but I can well imagine that to a stranger it must have been inordinately fasci-

nating. From the window one saw the panoramic confusion of changing time—an astounding view indeed as seen from the vastly accelerated speed of the time-line, comparable in a way to a movie film enormously speeded up.

One saw the cascading confusions of melting and rising cities, superimposed upon mirages of oceans and landscapes that rose and fell with the phantomic incredibility of a nightmare. The sun resolved itself into a golden streak imbedded in a purple sky, and the moon as an intermittent silver streak—the intermittence being caused by her phases as she changed from new to full.

The average speed of a time-liner was about 6 years in 1 minute. When a long distance journey was made, such as the final stop of Ten Million, we used to reckon it would take two ordinary years to get there. Such journeys were rare, and only done by relays of pilots when attempted. For a reason, that only Carreno knew, it was quite impossible to exceed 6 years a minute. To do so meant dissolution. Only his lost accelerator could make it possible to enormously increase our speed without danger.

Our journey this time was due to end at the year 40,000. The destination of Elna was, of course, 20,000, and her Age would be our first stopping place—about forty-eight hours' trip. I make all this clear, you understand, so that you may follow how our system worked.

It was a remarkable sensation, even to a hardened pilot like myself, to watch the incredible weavings of time as we moved silently onwards through it. Since our departure had been from New York, we naturally would come to rest in New York some twenty thousand years later. Be it understood that the time liner itself never moved in rela-

tion to stationary objects, except for the diagonal movement into the fourth-dimensional time-line. All we saw was the movement of Ages speeded up, which normally would have to be evolved through.

I stood for a while watching the intermittences of summer and winter on the changing face of the city, watching the mad chaos of clouds moving at desperate rates, and the swinging of the sun from solstice to solstice. I looked upwards in the brief flashes of night and beheld the shifting orbits of the planets, the phantasmal appearance of a comet about 2,034, and so on. Somehow, I never lost my absorption at the almost uncanny wonder of it all.

"Everything's O. K., sir." Sub-Engineer Aldbury's voice aroused me from my preoccupation.

I nodded. All right. I'm going on deck for a while. If anything's wanted, let me know. I'll be back shortly."

"Yes, sir." He saluted and took over the controls. There was little to do in controlling a time liner. It was understanding it that counted.

### CHAPTER III

#### Resolved Into Atoms

**I** WENT up along the enclosed lead-sheathed deck, with its specially constructed glass outlook windows. It was, as usual, filled with passengers, either promenading or reclining, the majority looking at the amazing view through the windows. The solar generators provided the liner with a comfortable degree of heat and light, for the exterior lighting during these trips was of bluish green, and utterly impossible to properly read or see by.

I saluted those whom I knew as regular travelers and continued on my way,

stopping at last at Elna's suite. Lightly I tapped upon the door, but, somewhat to my surprise, there was no response. I gently tested the door and found it locked. Puzzled, I looked through the window, and beheld Elna seated in the armchair, engrossed in a novel. Evidently I had not knocked hard enough, so I tried again, and still I got no answer. A second look proved that she still was reading. A panicky thought seized me that something had happened to her. Being in control of the ship, I had duplicate keys of every room and cabin. In less than a minute I had secured the one for her suite, and flung the door open wide.

"Elna, what's the matter?" I exclaimed in alarm, striding forward.

Still no movement from her. She remained in the same position, head slightly bent to shield her features, her hands gripping the novel with its slightly lurid cover. She did not seem to have heard my entrance. Mystified, I went closer to her and seized her arm. At least that was what I intended to do, but can you imagine my astounded feelings when I went right through her! I fell heavily on the armchair, right through her body—yet when I staggered upright again she was still there, absorbed in that book. I looked underneath at her face, but it vanished in an impenetrable shadow.

"What on earth's happened?" I panted, looking about me. The first thing I beheld was the interconnecting door to the next suite. Rapidly I searched out the necessary key, twisted it in the lock, and entered the next apartment. A familiar figure moved from the table in the center of the room and stood standing watching me with a little smile of amusement puckering his thin, harsh lips.

"Elnek Jelfel!" I said, drawing a deep breath.

"A rather sudden entry, Commander, but perhaps the captain of the ship has certain rights of which I am not aware," he said coolly. "To what am I indebted for this visit?"

"There is something peculiar connected with Elna Folson, in this next suite," I said, striding towards him. "As Commander of this ship I must ask you to explain. You are the only man aboard likely to know anything about it."

He stood silent for a moment, and my eyes wandered to a group of queer devices upon the table. Then he shrugged his shoulders, closed the connecting door, and smiled again.

"I have said before, Commander, that there are a lot of things we know in the Age of Problems, that have never been even heard of elsewhere. Perhaps, after all, you are entitled to an explanation. There is, as perhaps you know, a certain scientific theoretical reasoning that it is possible for me to put into practical use."

"What reasoning is that?" I snapped.

"The endowment of a two dimensional image with the necessary third-dimension to make it a three-dimensional solid."

"This is all by-talk!" I said hotly, but he interrupted me with raised hand.

"Far from it, Commander; far from it. The endowment of a two-dimensional image with a three-dimensional solidity is but an elementary effort of the Age of Problems. In fact, this three-dimensional effect produces a perfect solid, so life-like that you mistook a photograph of Elna Folson for the real thing!"

"Good heavens! You mean I spoke to an *image* of Elna?"

He nodded and smiled sardonically; then I seized his shoulder in a clutch of iron.

"You swine!" I breathed. "I never

liked you anyway, and this about finishes it! Where is Elna herself?"

"Would you really like to know?" he asked pleasantly, shaking my hand free.

"Of course—and hurry up about it!"

"Very well, then . . ."

HE led the way to the armchair and motioned me to be seated. His green eyes surveyed me thoughtfully for a moment, and I returned the gaze with as much coldness as I could muster.

"Commander Lee, I think you are a man of average intelligence," he said at last.

"Thanks," I returned laconically.

"No offense, Commander, I assure you. I say that, merely because what I am about to expound to you might tax your credulity a trifle—but, if on the other hand you are scientifically inclined, it will leave you with an unbounded appreciation of the Age of Problems."

"You can cut out all this grandiloquence," I said curtly. "Get on with it. My time is valuable, and unless you can very satisfactorily account for the disappearance of Elna Folson, I shall be forced to put you in charge."

Jelfel chuckled oddly at that remark. "At the present moment Elna Folson is imprisoned in my Age, quite unaware of how she came to be imprisoned, and will stay there until I see fit to release her."

I caught my breath sharply. "But that's impossible!" I ejaculated.

"Not altogether, Commander. Observe!" He moved to the instruments upon the table and finally set to work with one that reminded me very much of an old-time ciné projector. It evidently was something of the kind, for presently upon the cream enamel of the opposite wall there appeared Elna, once again, seated apparently in mid-air, reading. I stared at it in amazement,

so utterly life-like was it; then with a grin that had something devilish in its quality Jelfel switched the instrument off.

"That, of course, was Elna," he said sardonically. "On the trip up last time I took a photograph of her on the promenade deck. She was reading a novel—the one you have seen. Careful treatment on my part enabled me to remove everything from the negative except her own form. I even eradicated the chair in which she sat. The finished effect is that she appears to be lounging in mid-air. Naturally I reversed the negative to positive by including thiocarbamide in the developing solution. All that is necessary to resolve this positive photograph into a three-dimensional solid of the original, is to use this three-dimensional ray." He switched on another of his small instruments, and the resultant beam seemed to pass right through the wall.

"You see, this ray contains the power of having infinite wave-length; it passes through anything. Now, what is done is this: The original film or slide of Elna is put in the projector gate in the ordinary way, and shown—but the illuminant is not a carbon arc, but this ray. I had better add that the ray can be shortened or lengthened as desired, so as to resolve the image at any desired distance; nor, by a secret process of my own, does the image ever get beyond life-size, no matter how distant it might be. Hence, this photographed image is projected wherever necessary, and the screen on which it appears is merely created by the motes of dust in the air itself. The finished result is a projected photograph so natural and solid that only careful inspection can prove the difference. I had merely to project Elna's image into the next suite about the position of the armchair—observe if I had it

correctly arranged by the simple expedient of the keyhole—and there you are. Nothing can block the ray, of course, not even this solid wall."

"I admit the cleverness of the idea, but what use is it?" I demanded. "Why do you want to project this picture of Elna, anyhow?"

"So that anybody would swear, if necessary, that Elna Folson was sitting reading in her suite at such and such a time. Just a little safeguard, though it will probably never be needed. . . . There is another thing. I usually take a moving picture instead of a still, and also a voice record. This of course is merely an advanced system of this childish slide idea. I knew I should need that photo of Elna Folson when I took it—and I knew also that you would come and ask me all about it."

"How?" I asked.

"Time has many things to tell," he answered quietly, looking at me with those big green eyes of his. "Of course, I have not all the energy contained in these little boxes. The real source of energy connected up with these machines is in the Age of Problems, which perhaps I will have the pleasure of making clear to you at a later date . . ."

He paused and came slowly towards me, contemplatively.

"There is one thing about the Age of Problems I must make clear to you, Commander."

"Indeed?"

"You know nothing about it, do you?"

"No man does—it is apparently impenetrable."

"Quite so; but you know what Age comes immediately before it?"

"Certainly. The Age of Security—the two-thousand-year span to which Elna Folson belongs."



"Just that. And what comes immediately after the Age of Problems?"

"Why, the Age of the Second Birth, when the earth apparently starts anew with the rudiments of a shattered civilization—rises from a world of blackness and ashes."

He nodded silently. "You are a good pilot, Commander—you know your job! The Age of Problems, let me explain, represents the peak of intelligence, the climax of the Second Intellectual Cycle. It happened in the past. The last civilization ended in the Era of the Egyptian Intelligences, when they reared those mighty pyramids and Sphinx from the very atoms of the sand, and were then wiped out in a cosmic disaster, from which the later races sprang. My Age represents our own peak of intelligence—the Second Cycle. It starts again on the Third Cycle immediately after my age, and ends once more with the period known as the Age of Intelligence, after which the earth can no longer safely hold life. There are three cycles of intellectual growth in earthly history. The Egyptians came first; my age constitutes the peak of the Second; and the Age of Intelligence constitutes the peak of the Third. Rather incorrectly the Age immediately after mine is called Age of Second Birth. It should be Third Birth, but we will waive that matter. My Age is, without egotism, the supreme Age. Never before or since has anything equalled it; I have seen that for myself. About my Age I have girt powers which no ordinary intelligence can understand or penetrate—hence it is known as the Age of Problems, and I, Elnak Jelfel, am its Master."

Somehow I had lost some of my distaste for the man as he went on talking. He had a gripping quality about him.

"Your explanations are very inter-

esting," I said, "but it doesn't explain the reason for kidnapping Elna Folson, when you've finished!"

"PATIENCE, Commander, I beg of you. It is impossible for me of the Age of Problems to advance further than a few months from the present—and by 'present' I mean my own time, 22,000. The reason for this I cannot quite understand. To try and force myself forward beyond a few months causes dissolution, disintegration of my bodily atoms and molecules. It has been said that my Age has been seen towards its close as a blackened wilderness, devoid of life. That I cannot understand, either. But, however, I am digressing again. Elna Folson, as you will know, is the daughter of the President of the Time Liner Corporation in the year 20,000, which naturally is in conjunction with the Corporation of 2,000."

I nodded.

"As you will also know, the President of 2,000 and the President of 20,000 have the original formula of Carreno's for the making of time machines. For a reason not altogether clear those time records are not to be found in my Age; possibly they were lost in an intervening period. I desire that formula, Commander, to make time machines of my own. Carreno was the only man in all earth's history who had the power to solve that supreme mystery; I admit him as my superior in knowledge. But I must have time machines of my own."

"Why?" I asked, giving him a keen look.

"For the simple reason that my Age is thickly over-populated. I must have extension; I propose spreading my people back into past Ages, despite the fact that no record is ever shown of anyone accomplishing the fact."

"You can't cheat Time," I said quietly. "What is writ, will occur!"

"The record of the incident might have been obliterated in past time," Jelfel returned calmly. "Anyhow, I desire that formula, and I mean to get it. Until Folson, the President of 20,000, gives up the formula, and agrees to withdraw and destroy all time machines from the service, Elna Folson shall stay in my Age. Her liberty is the price. No rescue can possibly be effected. By the same token I plan to put you in such a position that your death shall be forfeit, if your own Corporation in 2,000 does not accede also to the same demands. I must have the formula from both Presidents, and a guarantee of stoppage of all time-machine communication. I require past ages for my own uses, and will have no interference."

"You mean you would dare to imprison me?" I demanded harshly.

"Without the least hesitation, Commander."

"You forget. That formula is recorded upon machines, besides being in the minds of the two Presidents."

Jelfel smiled coldly. "You may rest assured, Commander, that when that formula is given to me, all other traces of it will completely vanish. I will be the only one to know the secret."

"You would kill?" I said hoarsely.

"If necessity demands it—yes."

"You devil! And you dare to tell me—the Commander of the ship—all about it!"

"Why not, my dear sir? I may as well be frank."

I breathed hard. "So it's you who's wrecking all our time liners! I thought so when I saw the Vibrator report a little while ago. I was going to tackle you about it. I have been assigned to

finding the cause of this fiendish destruction!"

"Quite an interesting vocation, I'm sure. The other time liners have been flung into infinity by a beam of pure negative electricity, which resolves the time liners into atoms. No soul ever knew what happened. The same fate awaits this ship!"

I sprang to my feet. "Not if I know it!" I grated. "I'll have the ship stopped!"

"I think not, Commander," Jelfel said softly, now holding in his hand something like a cigar made of aluminum. "Keep patient, please, or I may find it necessary to resolve you into atoms also—before your time! Don't move!" His face set in ruthless lines for a moment; then again he was all smiles. "If you will step over here, Commander, I will show you how Elna Folson was transferred to my Age."

I obeyed perforce and watched whilst he indicated certain instruments.

"All matter, as you know, is composed of atoms and molecules?" he said, looking at me interrogatively.

I nodded assent.

"Have you ever heard of the transportation of matter?"

"Only in theory," I answered, though I guessed what was coming.

"I have perfected a ray, entirely invisible, which has the quality of resolving any form of matter into its constituent atoms and molecules, afterwards reassembling them in the original form without any harm to the object concerned. In this wise anything can be moved from place to place in atomic form, within the beam itself, and reassembled wherever desired. In the case of Elna Folson, I focused the beam upon her suite from this little instrument here"—he pointed to a machine resembling a small searchlight—"and having ascertained beforehand her exact

position in the room, I set to work with the detector. That is this dial here. The needle always points in a direct line with the object to be dematerialized, by what is called 'sympathy with the aural frequencies'—the aura being the electrical emanation of the body. The beam has then only to be set in parallel with the detector needle. Thus, Elna was resolved into atoms and molecules and projected down the fourth-dimensional time line at a speed approaching that of light—186,000 miles a second. Elna, being in atomic form, could not disintegrate at that speed, as would a solid mass of matter, such as this time liner.

"Upon her atoms reaching my own age, my chief engineer would project the atoms to the prison, and reassemble them. Elna Folson would wake up in prison, her only memory being one of being in her own suite one moment, and, after a transient feeling of faintness, waking up in her prison the next. Of course, these instruments are also remote-controlled, the real source of power being in my own Age. This same system materialized me aboard a time liner. There was no other way."

"Why did you travel to past Ages in any case?" I demanded.

"For two reasons. One to find Elna Folson and imprison her to further my plan; and the other to determine the possibilities for my people when I move them."

I shook my head slowly. "Your tale sounds thin to me, Jelfel. You have some other motive behind all this—something different than merely securing a time-machine formula and finding an outlet for your surplus populace."

"I have told you the truth," he replied in a hurt voice; but still I did not credit his words. If I judged the man aright he had far mightier plans

behind it all, but what they were was an entire mystery at that time. Unable to make further advances on that subject, I returned to the one on hand.

"I don't see how the atoms of any particular form of matter can be detected," I said. "How does your engineer know?"

"Entirely by his instruments. How does one identify a radio wave? It can't be done; the receiving apparatus does it for you. It is merely a system of vibration, by which the invisible is rendered visible. I will show it to you when we reach my Age."

"You are very confident, Jelfel," I said grimly.

"I have every reason to be, Commander. You may as well realize that you are quite in my power. It is my intention to project you also into incarceration in my Age. You are the 2,000 Corporation's best man. They will do much to save you."

"DON'T be too sure," I replied grimly. "And in any case, if you can do all this dematerializing process, why do you need time machines, anyhow? Can't you project your surplus people into past Ages?"

"No; I must have a medium. That medium is a time machine. In any case, I have not sufficient power to project a surplus two million people down the time line, even if it were possible to do it without the medium of a time machine—which it is not. The only way is to use time machines themselves."

"If that be so, why wreck the entire fleet of time liners? They would be very useful to you, I should think."

He smiled grimly at that. "You evidently forget, Commander, that to take the ships would mean taking the people. I do not want them; they might even prove very dangerous. No,

I must build my own ships. I give forth my ultimatum to the two Presidents merely to avoid using too much power to destroy the machines if they don't agree. Simplicity first, action afterwards . . . "

The more he went on the more I doubted his story. I wished I knew what his real scheme was, wished I could penetrate this feeble plot he had outlined. But no—I could not advance any further at that moment. Through the window on the wall I saw the speeding ages of time slipping by with confusing rapidity. I was in a tight corner, and I knew it. That gleaming weapon of his—I fancied it was a ray-gun—was no weapon to be trifled with.

Presently he spoke again. "Sit down!" he said in a grim voice.

I obeyed, and watched with an intense gaze as he swung round his Dissembler so that the gleam lens faced me.

"There is no other course, Commander," he said coldly. "You will go, and I will follow. In time this liner will be destroyed—but that won't worry either you or me. Please prepare yourself."

"Stop, you infernal devil!" I shouted hoarsely, and unable to restrain myself any longer I leapt for the alarm on the wall. I was too late, however. The ruthless lens followed me, and from it there suddenly stabbed a ray, a ray that could not be seen, but could be felt. I took one last look at all those portable instruments on the table, no larger than ordinary luggage. Then I became aware of a sensation of hurtling through the air. I seemed to fall over, and pitched helplessly into an abyss that seemed nought but a tumbling emptiness dotted with the glowing of innumerable stars.

## CHAPTER IV

### The Movable City

I HAVE not, of course, any means of discovering the period of time taken during my transition from the time liner into Jelfel's Age of 22,000. The darkness, and my plunge into a seemingly electronic world seemed to last a short time; then I felt a distinct tug at my invisible form. I presumed this was caused by the atoms and molecules of my body being deflected from their path into prearranged channels in the Age of Problems. Followed a moment, transient and fleeting, of almost unbearable pain. . . . I found myself standing upright in a room of moderate proportions, lined with walls of metal, possessing only a small ventilator in the roof, and one metal door with a small grille.

I blinked, rubbed my eyes, and then felt myself. I was as normal as I had ever been. I fell to pondering for a space upon this scientific miracle of re-assembly; then, my mind clearing from the fog of transition, I began a tour of inspection.

My discoveries were not comforting. The metal of my prison was composed of some curious substance that seemed to be a cross between iron and glass. I later learned it was called iralium, and possessed the curious quality of being transparent to all vibrations and rays, from the highest to the lowest—and yet it was of almost inconceivable toughness. Its melting point, it appeared, was somewhere in the region of 6,000 degrees Centigrade! Considering the melting point of tungsten, the hardest metal discovered up to the year 2,000—its melting point being about 3,450 degrees Centigrade—I came to the pretty obvious conclusion that any attempt to melt iralium with the ray-gun I had in my uniform, would be pretty futile!

All this about iralium, as I have said, I learned later. At the time I was busy seeking a way out of the prison.

The lock of the cell door was the most curious thing I ever saw—remarkably fragile, the ward being no thicker than a lead pencil, and fitting into a similarly thin clasp. The actuating force of the lock seemed to lie in a little box about four inches square, riveted to the door itself. Yet, although I tried to break that ridiculously thin bar, although I tried my ray-gun upon it, I failed to make the least impression. I was contemplating what to do next when a voice, quite familiar, spoke to me. I looked round, but saw nobody; above there was only the ventilator and little yellow lamp.

"Commander, I shouldn't waste time trying to break that lock if I were you," said the voice of Elnek Jelfel. "The lock is controlled by thought-waves, and the metal is known as iralium." He then proceeded to tell me what I have already related concerning it, continuing: "My voice is of course coming to you over the radio beam, which I told you could be connected to my three-dimensional projector if necessary. It is my desire to have a talk with you. In a moment the door latch will be open by thought impulses. You will walk down the corridor and turn to the first door on the left . . ."

"You seem mighty confident of it," I said into the air, and evidently he was tuned in to my voice with his marvelous instruments, for he answered:

"From the moment the latch opens, until you are with me, you will be controlled by what is known as radio-hypnotism. You remember the remote-control wireless control of the old days? Radio-hypnotism is a ramification of that art. It is a system of impulse, so tuned that it is in perfect alignment

with the frequencies emanating from your brain. Now get ready!" The voice ceased, and I watched the door tensely.

Sure enough the ward slid back, and, suspecting his radio-hypnotism to be something of a bluff, I jumped forward, intending to make a dash for escape. To my horror, the effort was completely useless. A sound echoed through my head, very much the same as that in a loud-speaker, when a valve in the wireless set is struck. In that moment I became bereft of all thought and reason; I saw nothing before me but a long corridor of iralium, curiously superimposed upon by a vision of cogs, meters, flickering needles and electric spark-gaps. I can only presume this latter effect was occasioned by viewing, semi-hypnotically, the instrument which was the cause of my mental enslavement.

My next really conscious realization was of being before Jelfel in a remarkably large, brilliantly lit hall, flooded with the glare of colossal arc lamps. This effulgence glinted upon machines and instruments of which I had no knowledge, and threw back their brilliant rays from droning engines and generators of immense power and voltage.

Against a great black wall of switches, dials, and controls I found Jelfel, attired in a close fitting black costume. The material of this costume, as tough as canvas and yet as elastic as silk, clung rather tightly to his form, and revealed every line of his almost more than perfect figure.

His brooding green eyes were upon me, half in amazement.

"GREETINGS, Commander," he said a trifle dryly.

I moved towards him. Somewhere behind me a door slid silently into place



and locked itself. I had been prepared for remarkable science in the year 22,000, but never had I expected such a veritable multitude of scientific apparatus, as that which now closed me in. I did not hesitate to admit to myself that I was beginning to feel a trifle afraid.

"One hour ago, Commander, you were aboard Liner 48," Jelfel remarked, pulling forth a chair and inviting me to be seated. "In exactly ten seconds"—he looked at a queer clock upon the wall—"your liner will pass across the beam of negative electricity I am projecting at the time line. The reason for the alteration in time, by the way, is caused by the advancement in time in relation to yourself. You may, or may not, understand that. Time is full of paradoxes. Days pass in seconds in Time. However, Liner 48 will be hurled into infinity, and it is my wish you view the proceedings."

I half rose to my feet in anger, but his compelling eyes forced me back.

"Don't attempt any moves, Commander. Tampering with millions of volts of electricity won't do you any good. And besides," he added, with a most unholy smile, "I don't want my apparatus to be short-circuited!"

For a moment there came a silence between us: silence, that is, save for the drone of generators and dynamos. Then Jelfel turned to me again, his hand upon a massive, four-pole switch. He nodded his black head toward a three-foot screen of what seemed to be ground glass. "I'm going to show you the actual destruction of your beloved time-liner," he explained grimly. "The machine I am controlling now is a Light-Wave Trap. That is to say it imprisons the light waves within a narrow beam and reproduces them upon the ground glass screen there. The beam is now tuned directly upon the spot

which Liner 48 will cross. You will see everything for yourself. Just watch."

He pushed up his four-pole switch and a stream of blue fire flared from point to point, and jumped across a gap between two pencils of copper like a writhing snake of turquoise. A resistance-coupler, low down by the floor, hummed transiently as a powerful voltage passed through it to some hidden earthing system. In awe I watched, and wondered, if this was only a Light-Wave Trap, what on earth must his beam of positive electricity be like! I was shortly to discover!

I looked at the ground-glass screen and failed to observe anything beyond blackness for a space; then very gradually I beheld the vision of my own beloved ship, as yet unharmed, appearing in view. Mentally I pictured Aldbury, the engineer, at the controls, wondering what had become of me—and Elna Folson. Unless Jelfel had left his shadow image of her to disguise suspicion, I did not know. . . . Very slowly the vessel came into full view. I could imagine Aldbury's misgivings at approaching that mystery disturbance, but evidently, having received no other orders, he was going on. Then suddenly there came a soundless coruscation of astoundingly brilliant light. I was compelled to shut my eyes for a moment. When I looked again I beheld just—blank nothing! The ship had been completely disrupted, hurled into the enormities of endless space and time. I had hardly absorbed the horror of this fact when two one-hundred-foot tall pillars of copper at the far end of the vast room turned green. The energy emanating from them hurled itself upon the resistances lined against the wall, and streamed with devilish, terrifying power into colossal earthing contacts. Tubes—colossal six-foot tubes of tremendous thickness of glass—flared

through all the colors of the spectrum, emitting beams of pure ultra-violet that stung the eyes and blistered the skin. A bass humming shook the iridium floor, and from somewhere came the twanging of enormous percussion springs. Then abruptly all was as it had ever been.

I turned back to the grimly smiling Jelfel.

"What caused that?" I demanded.

"Merely the throwback from the beam impinging upon the time liner," he said in a matter-of-fact voice, then turning aside he switched off his numerous instruments, presently looking round again and surveying me thoughtfully.

"I have sent a message on beam radio to the Presidents of 2,000 and 20,000, concerning my ultimatum," he said slowly. "I expect the answer any time."

I looked at him stonily. "And you're fool enough to think they'll agree?"

"It would be to their advantage to do so," he answered. "If they do, I will return you and Elna Folson to your respective Ages without molestation. If they do *not* agree, I shall wreck every city in the time line from 2,000 to 20,000, and obliterate, by the same token, the fools who control them. Then I will transport my people as I planned, by securing the information from the dead brains of the respective Presidents."

Again I felt he was disguising his real motives, but for the life of me I couldn't fathom him.

"If you can get the information from the Presidents, even if dead, why do you have to wreck all the cities?" I demanded.

"Because, my dear Commander, I do not require time liners to operate any longer. Even the death of the Presidents, if I am forced to it, will not stop the running of time liners. Com-

plete obliteration is the only course. You see, I am trying to be amicable and pleasant by making an ultimatum."

"If flinging thousands of innocent lives to doom is your idea of being pleasant, I don't want to see you when you're really annoyed," I grated.

He revealed his teeth in an irritating smile. "To be *certain*, is always my way," he answered calmly. Then, easing himself from his indolent position amongst the instruments he said: "Perhaps you would like to see some of my machines, so that, should you at any time conceive the utterly absurd idea of opposing me, you may realize what you are up against!"

He motioned me to follow him, and leaving the hall of complexity we entered another one of even vaster proportions. I cannot describe it to you; it was a riot of engineering genius and scientific apparatus raised to the *nth* degree. . . .

I T possessed a glass roof, through which the morning sun was streaming. I noticed that the sunlight had an odd coppery tinge, the reason for which I did not discover until later.

Jelfel pointed to a barrage of wires and enigmatic boxes and dials.

"With that," he said, with merciless decision, "I shall destroy every city in the time line between 2,000 and 20,000 if the reply to my ultimatum is not satisfactory! It emanates a vibration of such force and depth that it excites the atoms of any given body so violently as to cause the collapse of that body. Not disintegration—not dissolution—just collapse, you understand. For instance, it would raze a building to the ground by perpetual vibration and tremor. It causes, in effect, a perpetual earthquake, so persistent that everything must finally crumble before it. It is sent through

Time by a process of deflection. First on to the time line itself, tuned to any given Age, then deflected once more from the line into the Age, forming, if you can mentally picture it, a figure like a square U, the base of the U being the time line."

I listened in aghast silence and wondered to his cold-blooded exposition.

"This is the Atom Reassembler, of which I told you. This dial here registers the position in space of any given number of atoms, 'one' counting as 'one million' on account of an atom's smallness. This other dial shows approximately what the atom will resolve into when reassembled. The instrument is attached to a propulsor, which propels the atoms to any desired place."

He walked on casually as he explained, like a guide in a museum.

"This instrument here is pretty similar to the one I explained—only more complicated. It is the automatic Atom-and-Time-Dissembler. It also embodies a Reassembler, timed to work at the limit of projection. That is to say, the Ages are indicated here on this chart. If you wanted to visit, say, 1600 A.D., you would set the pointer to that point and throw in this switch. That switch would dissolve you—or any amount of people at once up to six—and would project you to that pre-decided Age—1600. Upon your arrival there the reassembler switch would operate and you would materialize—all automatic. I've made many a trip with that. I have a bigger one that needs an operator, but this is a perfect self-functioning machine. You will notice I have a wide range of Ages—anything from prehistory to Ten Million. . . ."

"Now this instrument here is rather clever. It is an Emanation Detector, and beside it we have a chart of computed emanations. Every form of matter, organic or inorganic, has a certain

quality of emanation, has it not?"

"I suppose so," I answered.

"Of course it has! For instance, light emanation to start with—and many other forms of vibration besides. Light emanation or vibration was the basis of this instrument, which I discovered for myself. A white object has naturally a higher order of light emanation than a dark object; whilst a medium white object has an emanation between the two. You understand?"

I nodded.

"Well, my further investigations revealed that all matter has also another emanation, besides that of light. This emanation is created by the protons and electrons themselves, but is inconceivably minute, requiring a power amplifier to bring it into proper focus. Now, in inanimate bodies, such as soil, metal, and so forth, the emanations are very low, due, I imagine, to the stationary condition of the object. But in the moving objects, such as human beings, animals, etc., the emanations are very high, due to the *constant movement* of the object concerned. Now again, like finger prints, no object has exactly the same emanation as its neighbor, and, as there are upwards of fifty thousand important forms of matter in everyday knowledge, it took me some little time to tabulate the approximate frequencies of matter—but it was very interesting! I did at last succeed in fixing what I call degrees of emanation—from one to fifty thousand. There you see the numbers on the dial, and the big pointer ready for moving. When that pointer is set at, we will say, a stone of about four inches circumference five miles away, we have to find the approximate frequency of that stone and calculate the distance and the area." He made astounding calculations on a sheet of paper. "The frequency of that stone, in accordance with the five mile

distance, is about 480. We will turn the pointer of the Emanator to that number." He suited the action to the word, and there appeared on a metal screen before us a dim vision of some object lying upon the ground, presumably five miles distant. What system of magnification and telescopic device he used, I could hardly guess at—or how he overcame the bend of the earth's surface. Elnak Jelfel to me, at that time, was a man of complete mystery. From his hints I gathered his telescopic work was done by a reflected-image system at the horizon limit. The system was a trifle too complicated to make clear in ordinary language.

"There we are," he said, adjusting a knob, and I looked in the screen to see such a stone lying upon the ground in the sunlight. "A trifle more than I expected," he said; "492, to be exact. You see, with this instrument, I can usually find anything at any time, providing it is within a five mile radius. Later I shall solve how to increase the radius indefinitely."

My interest in this particular product of a genius was more than normal. A vague idea was forming in the back of my mind that I might find it quite useful to me in making an effort to escape; indeed, not so much use to me as to finding Elna's whereabouts. This idea in mind, I stepped closer to the machine and looked at the tabulator. I noted that Jelfel's green eyes shone with genuine pleasure at my interest; manifestly he was a man who lived and died for machinery and achievement.

"Suppose—suppose one wanted to find a human being?" I asked him, trusting to luck he would not suspect by motive for asking. Evidently he did not, for he went to great lengths to fully explain to me. The gist of it was that all human beings have a different

emanation, according to age, coloring, state of health, sex, and so forth. I gathered enough to know that a blonde has a higher emanation than a brunette, that a woman has a higher emanation than a man, and that the emanation of a girl like Elna would lie in the region of Emanation Number 1016. If this was not correct I knew enough to perform those gymnastic mathematics that would prove, to a fraction almost, where she was. I held that number, 1016, firmly in my mind.

"Another masterpiece," Jelfel said fondly, becoming so absorbed in his scientific achievements that he seemed to be forgetting I was a prisoner and not a visitor. He indicated a tall stand akin to a tripod, with an affair on the top like a reflex camera. On the floor, in line with this "camera," was a metal plating.

"The Growth Determinator," he explained. "This instrument contains yet another of my special rays, and anything within its focus is either reduced or enlarged from normal size by altering the vibration of the atoms and electrons in the body."

"At that rate, Jelfel, you could visit an atom," I said.

"I don't think so," he answered. "To visit an atom would mean crossing a gulf of void at some period, in order to alight on the minute planet. It could be done with a ship of some sort, not otherwise. Hmm, I must ponder that problem. Thanks, Commander." He dabbled about with the controls, increased his size by double to prove it to me, and then, normal again, continued the tour.

The amazing trip came to an end at last, and I was, I must admit, aware of great admiration for his genius and inventive powers. A pity, I reflected, that his real aims should be so ruthless and warped.

Then it seemed he suddenly remembered I was his captive. He became once more suave and sardonic.

"Have you any idea, Commander, what the world looks like in this Age?" he asked.

"The New York of 22,000!" And as I shook my head he continued, "Come to the top of the observation tower. I feel sure you will be interested."

"Look here," I said grimly, taking his arm, "don't you think this business has gone far enough, Jelfel? You are only showing me these marvels of yours to entertain yourself, and instill within me a fear and respect for your undoubtedly brilliant achievements. But I'd rather you did something definite! I would rather you put your cards on the table, and let us fight it out. Where, to start with, is Elna Folson?"

He shrugged. "Really, Commander, this is a sudden divergence, is it not? I might even say a breach of etiquette. Here am I, endeavoring to entertain you as your host, until I have the replies from the Presidents, and instead of reciprocating my generosity you ask difficult and entirely needless questions."

"My host!" I echoed bitterly. "That's amusing, anyhow!"

"I'm glad you find it so," he returned dryly.

"Until I hear from Messrs. Templeton and Folson it is my duty to entertain you and protect you, and so long as you do not attempt to do anything foolish I will do that. As far as Elna Folson is concerned, she is quite safe, and will be. Unless . . ." And the compression of his hard mouth into a thin slit left on doubt in my mind of the merciless cruelty to which he could descend if necessary.

For the moment, it appeared, it would be policy to comply with his wishes, much though it went against the grain of the complier. . . .

**T**URNING, he opened the door at the end of the great hall, and indicating an iralium staircase, motioned me to go up. I found the staircase twisted in spirals upwards for quite five hundred feet. I confess I didn't relish that climb, but I went upwards steadily, glancing at the blank iralium walls as I progressed, and remarking the neat bulbs of white light placed in them at intervals.

We came at last to the broad, flat platform of the summit, five hundred or more feet above the city level. It was, of course, sunny, and once again, as I glanced up, I noticed the odd coppery tinge of the sky, and even more coppery sun at the zenith. I was studying the phenomenon when Jelfel came to my side.

"The coppery sun?" he asked, interpreting my thoughts.

"Yes. What is it? Cosmic dust?"

"No; etheric vibration, with which this entire Age is sheathed. It is absolutely impossible for anything solid to get through those vibrations. So you see"—he smiled that strange smile—"I am quite isolated. The vibrations emanate from those towers you see over there." He pointed toward a spot about a mile away, and, taking my first look at this city of 22,000, I gave an involuntary start.

The place was a machine-mad riot!

The only thing that allied it to an ordinary city was the lay-out of the streets, arranged with an orderly and geometrical precision. The buildings themselves, however, whilst they did not any of them attain sky-scraper proportions, were all circular, and built upon what were evidently enormous wheels. To each building there was fitted something resembling a gleaming cylinder. For all the world, the city looked like a vast mass of inverted



metal basins, with the mystic cylinders and wheels attached thereto.

I turned and looked at Jelfel.

"You have a curious city," I remarked.

He nodded. "In that respect, I think the Age of Problems is unique, Commander. All the buildings are built upon wheels. The cylinders you see are atomic force motors, which, if necessary, can propel the buildings from place to place. I have already told you of our excessive overcrowding. That is why I gave orders for all buildings to be made movable, so that, as the race multiplies, they can spread further and further afield."

"Surely you can stop this constant increase?" I asked.

"Yes; but why should I? The Age of Problems constitutes perhaps the most intelligent race ever evolved. Why should I stop knowledge? Better to wipe out the lesser intelligence and let my own spread—than stop mine and let the others stay."

His ruthless viewpoint was obvious. I turned to the rail and looked over the side. More movable buildings—everywhere the same—from horizon to horizon. I turned back and found that Jelfel deep in thought, was eyeing the horizon broodingly from the other side of the platform. For a moment his vigilance was relaxed; his extraordinary mind was groping with deeper problems than my own precise whereabouts. . . .

My eyes moved from his slim back to the square trapdoor opening in the floor that led to the lower regions. I did not know at that time whether my next action was foolhardy or not, but seeing an opportunity I put my innermost plans into action. Springing forward with one bound I seized Jelfel round the neck with one bent arm, and dragged him down to the platform floor. He fought furiously, but having precipitated matters I resolved to see the thing

through. I may not have been his match mentally, but when it came to physical power I was easily the master. For only a short time we rolled about the floor, then at last I managed to secure his feet and hands with the belt from my uniform.

As I struggled to my feet he glared up at me.

"You fool! Do you think this is going to do you any good?"

"If I didn't think so I shouldn't have done it," I answered curtly. "You can stay there for a while, Elnak Jelfel, away from your beloved instruments, whilst I get busy on my own account." My words seemed to goad him utterly, for he struggled with might and main to tear himself free from the tough leather that held him.

I took little heed of his threats and curses. I knew I had stranded him in about the best place of all—at the top of the observation tower. I plunged forward to the spiral stairway, slammed down the trapdoor behind me (I could find no means of locking it), and commenced to climb downwards as rapidly as I could go. So far I had succeeded by pure simplicity; everything else depended upon my speed.

Gaining the enormous instrument hall I ran across to the Emanator, searching the shelves of my memory for the number Jelfel had said would coincide with a girl of Elna's build and formation.

"1016," I breathed, swinging round the heavy pointer to the hair-degreed number in question. "One—O—one—six!" I was biting my lower lip with the intensity of my effort, one ear cocked for the first signs of danger. Securing the number at last I threw in the switch and stared intently at the metal screen facing me.

Something merged out of the vagueness, something amorphous and ex-

tremely blurred. Something that moved to and fro like a nebulous smudge on a velvet blackness. I looked about me and found the focussing knob. Gently turning it I was rewarded to find the blur decrease a trifle; then at last it came into perfect distinctness.

It was Elna herself, pacing to and fro in an iralium prison, similar to the one in which I had found myself. I looked very closely and dimly beheld the number "9" on the cell door.

"Elna!" I breathed, forgetting that she couldn't possibly hear me. "Now I know where you are. Cell 9, wherever that is." I pondered for a moment, then made up my mind.

Hastily switching off the Emanator I leapt across the great room to the Growth Determinator. Switching on the power, as I had seen Jelfel do it, I put myself in the full intensity of that beam, enlarging my size gradually until I stood quite fourteen feet tall. I reflected this would be useful in case of danger. . . .

I became aware that I was enormously heavy. Though not a brilliant scientist, I knew enough to realize that the ray had in some way altered the normal vibration of the atoms and electrons in my body, and hence had increased the energy in my body. Naturally, the result was that my weight had increased in proportion to my size. There were no scales handy on which to weigh myself; and in any case I had not the time.

Reaching forward with a mighty hand I switched off the ray, and stalked with Brobdingnagian strides down the hall. The various instruments seemed to be much smaller to me now, of course. Everything in size is relative. I felt curiously unafraid of anything and everything. I only paused once and that was to pick up a massive girder-wrench from the floor. I doubt if I could have even raised it normally. As it was now,

it was comfortably heavy in my grasp.

Gaining the outer door of the second instrument room I found myself in the iralium passage way. No sounds came to my listening ears, so I advanced, looking about me keenly in the light from the yellow ceiling bulbs. I wondered why no sunlight was admitted to this prison building; perhaps it would tend to make the hapless inmates too cheerful!

So I went on down the long passage, until at length I came to the first cells. These were different from my own, mainly by reason of being smaller, and because they had ordinary key locks, and not thought-impulse. I came at last to Number 9, which I had seen in the Emanator so dimly, and looked inside.

"Elna!" I said softly, and that something stirred within and she herself came to the bars, looking out on my colossal form in something akin to awe.

"Why, Sandy— Oh, thank heaven! But what on earth has happened to you?"—she went on rapidly. "Have I shrunk, or have you grown?— I—"

She stopped suddenly and my hand tightened on the girder wrench as suddenly, from round the nearby corner, there appeared a guard. At the sight of me he stopped in dumbfounded amazement, then he bravely tugged out his disrupter and levelled it. In one gigantic stride I was upon him, had flung the ray-gun from his hand, and lifted him on a level with my eyes by a slight effort of one massive arm.

"I have no wish to hurt you," I said, "but if you are sensible you will do as I order. Have you the key for Cell 9?—this one here?"

"Yes, but—I dare not betray Jelfel. I dare not defy orders. It means death!"

"You will do as I say, or it will not be left for Jelfel to kill you," I

answered grimly. "Open that door!"

He had no alternative. I lowered him to the floor again and he opened the door with a rattle of keys. Instantly Elna tripped out into the passage way, and with one shove I sent the guard sprawling into the cell, in her stead. I snatched away his keys, locked the cell door upon him, and then flung the keys away down the passage.

"Quickly," I said to Elna, and gathering her up under my arm as though she were only a china doll, I sped back towards the instrument rooms as fast as my enormously long legs would carry me.

I lowered Elna to the floor when at length I arrived there, and stepped across to the Growth Determinator. It was but the work of a moment to reduce my size back to the normal five foot ten again.

"WHAT'S all this about?" Elna demanded tensely. "Have you beaten Jelfel at his own game?"

"For the time being, yes," I answered her, and as quickly as possible explained what had transpired since seeing her last. "So the thing to do is get back as quick as possible," I concluded. "The only way to do it is by the Atom Dissembler—the same thing that materialized Jelfel on the time liner. We've got to beat him to it. He means business. Come quickly."

I strode towards the instrument in question, seizing Elna by the arm—then I paused as a sudden steady ticking upon the great ebonite wall arrested my attention. I looked closely at the maze of instruments, and at last traced the cause. A mechanical device of some sort was rattling out printed characters upon a thin sheet of white metal. Intently, Elna and I surveyed the message as it came through, and it did not take long to apprehend that it was the

answer from Templeton and Folsom.

"OFFER REFUSED. ULTIMATUM WILL NOT BE CONSIDERED. TEMPLETON."

"OFFER ENTIRELY BEYOND THE BOUNDS OF POSSIBILITY. FOLSON."

"They refuse!" Elna breathed. "My own father refuses! They would rather we went to our deaths than give in to Jelfel! It's monstrous! I'll tell Father something when I see him!"

"Duty comes before flesh and blood," I replied quickly, turning away. "I'm glad that has come through, for we know now what to do. We've got to get back to 2,000 and warn Templeton of what's coming. He can tell your father. Jelfel will stop at nothing now. Come on!"

I clutched her again and almost dragged her to the Dissembler.

"But look here," she said, as I set the controls of the instrument to 2,000; "if this Age is sheathed in etheric vibration we can't get through it!"

"The vibrations stop all solid matter, but not atoms," I answered, preparing the switches. "There is nothing to fear. We will merely be projected into 2,000, and upon reaching there the automatic control here will work and resolve us back into our original form. Jelfel told me all about it."

"I have a cheery thought," she said, with that infectious little smile of hers. "I wonder what it would be like to never materialize. . . ."

"Good heavens, Elna, don't say such things! Now, are you ready——?"

I stopped and looked across at the open doorway leading to the observation tower. There stood Jelfel himself, dishevelled and furious! So he had managed to get free after all—probably with his ray gun. He stood still for just a moment, then he positively hurled

himself across the room, was even touching the controls of the Dissembler as I flung in the master switch. . . .

The next instant Elna and I were hurled into that strange, seething fluctuation of an electronic world. For my own part I seemed to hang thus for eternities, like a lost soul between worlds; then, after a duration of such length that I began to fear something had gone wrong, there came again that transient pain and I materialized, to find Elna, a trifle pale but otherwise unharmed, by my side.

"Done it!" I breathed triumphantly, looking at her; then I turned to lead the way up the small hill upon which we found ourselves. I thought it queer that we had moved so much in space in the interval as to land upon a hill; at the least we ought surely to have materialized somewhere in New York or its environs. . . .?

As I toiled to the summit of this mound of curiously mushy soil I began to notice that the air was abnormally warm and stuffy. There was a steaming dankness over the land, a vast moisture, and overhead a mist and cloud-burdened sky. An inner consternation began to grip me. Elna came up to my side, and on her bright, intelligent face I noticed the same expression of incipient alarm.

We topped the little hill at last, and then stopped dead at the astounding, unbelievable sight that met our eyes.

Ahead of us there was no New York—no sign of man's handiwork at all!

Purely a vast extent of marshy looking land, bordered about two miles beyond with a jungle of colossal, titanic proportions. To the left there was a range of mountains, and to the right a great swamp and more jungle. Once I fancied I detected something fuming, incredibly huge, rise and fall in those oozing waters.

"Good God!" I said at last, my mind reeling before the frightful realization that swept into my mind. "Elna, this is the work of that devil Jelfel!"

"But—what?" she asked, utterly perplexed.

"Jelfel! You remember he was dabbling with the switches even as we dissolved? Well, we're not in 2,000; we're right away back in the age of monsters and saurians! Back in the beginning of the world!"

## CHAPTER V

### Primordial Terrors

"THE beginning of the world!" Elna whispered, her gray eyes staring out over the steaming wilderness. "We— Then, we're trapped, Sandy! Marooned—just like the old castaways we used to read about!" A faint, brave smile twitched her lips, as she turned to look at me.

"No castaway ever got in a jam like this," I replied. "Here, sit down. We must think this out."

I took off my heavy tunic coat, grateful to be only in my cool shirt, and laid it on the mushy ground. Elna, too, removed the coat she was wearing and did likewise, attired now in strong, serviceable skirt and thin, sleeveless grey blouse. And so we squatted there, baffled and perplexed, and gazed away for a space, in utter hopelessness, across that awful morass to the primordial jungle beyond.

Undoubtedly we were in the dawn of the world, perhaps so far back as to be before the coming of Man. Later I found this was indeed so, though what exact Age it was I never discovered.

"Sandy," Elna said at length, "We're in a most difficult position—I might even say awkward. We're marooned in a past age, and have no means of getting out of it. We have no food, no water,

and no shelter. . . ." She sank her fair head into her hands and ruminated deeply. She did not cry; she did not become hysterical even. Elna Folson was a product of the year 20,000 A.D., trained through years of evolution to meet a crisis not with panic and tears, but with intelligence and resource. I felt proud to have her as my companion on this new startling episode.

Presently she looked up with a start, and then down at herself.

"Look," she said, and pointed to steadily spreading patches of moisture upon her blouse. I looked at my shirt and found it likewise. So wet and humid was the atmosphere it was steadily saturating us!

This was a contingency we hadn't reckoned with. Scrambling to our feet we decided we might as well get wet walking as sitting still, so we set off, purely at random, in the direction of the distant jungle. I had an idea in the back of my mind that it might be possible to light a fire or something with the little ray-gun I always carried with me, though I frankly doubted ever igniting anything in this sodden immensity.

Coats slung over our arms we commenced to walk, skirting the edge of the morass. Its waters were entirely devoid of any growths whatever; no water plants of any description seemed to be visible. It was just a sheet, extending heavens knew how far, and from it arose, in occasional sickening waves, the most overpowering stench. I could only presume that stagnation was the cause of it.

The ground itself was excessively mushy. We found ourselves sinking over our ankles at each step, and the alarm that at first assailed us that we had stepped into quicksand was presently allayed, as we found solidity seemed to exist at a depth of about four inches.

It was slow, filthy progress, that slopping about in the mud and ooze of a prehistoric shore.

The more I saw, the more convinced I became that we had arrived in a very early Age indeed. The dense mists overhead, the excessive warmth and humidity, the great inland lake—all this pointed to extreme youth on the planet's part. The lakes were of course condensed steam, and the heat occasioned by the fierce internal fires of the earth, still extremely active from disruption from the sun. . . .

"Look!" breathed Edna suddenly, stopping and clutching my arm. "What on earth is *that*?"

I followed the line of her indicating finger, and beheld something towering out of the distant centre of the lake, something that made me gaze fixedly and with a growing sensation of horror. I could see a mighty head, immense bone-rimmed eyes, and triple rows of backwardly slanting teeth, but the rest of the body was submerged. The awful creature wallowed for a while, about as gracefully as an elephant in a public bath; then it plunged below the surface and vanished, sending wavelets splashing up upon the shore.

"What—what was it?" Elna breathed.

I shook my head. "Don't ask me! It doesn't come into the classification of anything I ever heard of before. I thought it might be a stegosaurus, at first, but now I'm quite sure I've never seen it reproduced anywhere, either as a skeleton or in illustration. We're in a nightmare Age, Elna; let's push on."

I took her arm and we squelched off towards the now slightly nearer jungle. I kept one eye on the lake in the meantime, but saw nothing else appear. I racked my mind as I progressed to try and classify that hideous specimen, but without success. Evidently its bones had never been found in a latter period. . . .



By the time we reached the jungle we were thoroughly exhausted. The intense enervation of the air seemed to double the amount of energy expenditure. We were two very strange figures. I dare say, could some superhuman onlooker have seen us—two lonely beings on the edge of a mighty lake, with an even mightier forest beside us. Two hopeless, weary creatures, drenched with humidity and perspiration, head aching, and feet caked almost ludicrously in sloppy, dripping mud.

The forest itself was the most astounding thing I ever saw. The tropical forests of 2,000 Central Africa have nothing to compare with it. The trees of this place shot up quite three hundred or more feet, and the boles at the base were of tremendous girth, I am sure that some of the larger ones must have measured quite twenty feet across. . . . And everywhere within was nought but a riot of foliage, a mad profusion of great vines and astounding tough ivy. Everything was a poisonous looking green; and nowhere could I behold a single flower to relieve the monotony.

**I**T was the Age of the Big. The little things were yet to come. Somewhere in all this slime and filth must lie the chemical qualities—the protoplasmic slime—that eventually would evolve into man. But not before many cycles had passed. . . .

As we gained the edge of the forest, I noticed it was becoming suddenly dark. I remembered then that, being so far back in time, the earth was spinning far faster than in my time. The complete rotation could not be more than five or seven hours. It all depended upon the exact period we were in.

A strange, primitive fear of the darkness assailed me. God knows, the Age was terrifying enough by daylight, without the awful abyss of night surround-

ing us . . . But there it was. Beyond all doubt night was falling, and once it began, it slipped into complete darkness without any suggestion of twilight.

Everywhere it became oddly silent, save for the faint rustling of great leaves in the scorching, thirst-torturing wind.

"Sandy, what are we to do?" Elna whispered.

"How can I say, Elna? I've only a ray-gun with me—that's the only weapon. We need shelter and food—and water. I wonder if—if that lake water is drinkable? My throat is like a limekiln."

"But the water is putrid!" she protested.

"Mebbe," I assented grimly, "but if you ask me anything, we'll be glad of even putrid water before long. Don't you realize what has happened to us? That we're completely trapped? We have no way out. . . ."

"We have—death," she answered quietly. "Oh, I'm not afraid of dying, Sandy. I know my limits. If there is no way out, there is only death for it."

I seized her hand in a tight grip. "Spoken like a true native of twenty thousand," I murmured. "Good girl! But we won't do it yet; we'll look around first. We have always the disrupter if all else fails. Now I'm going to try that water."

I turned to move to the lake edge, when Elna suddenly gave a startled cry and pointed skywards. Almost immediately I saw what had astounded her, and I admit I stood in sheer awe at the sudden majesty of a celestial spectacle.

For a moment the dense mists had drifted apart, and there, just clear of the horizon, hung a colossal moon—not a perfect globe, but apparently a gigantic pear, visibly slowly turning with the passing moments. Not an argent-faced, dead moon, but a grey mystery, a cloud-enshrouded world.

"Is that the moon?" Elna asked, a trifle doubtfully, all her fears and troubles forgotten for the moment in the contemplation of the astounding spectacle.

"Yes. And it proves, Elna, that we are amazingly far back in time. The moon has only just started its journey which will finally bring it to a stop 240,000 miles from the earth. The pear-shaped swelling is caused by the portion still slightly protruding where it was torn from the earth. As it continues to revolve it will gradually assume globular form, and at length become a dead world. Being a much smaller body than earth it will cool more rapidly and hold life a far less time. When it has reached that cooling period, Man on earth will be just beginning his upward climb."

My words floated towards the forest and died into silence amidst faint echoes. A very brilliant speech to make upon a primordial shore, forsooth!

The moon covered again by the ever encroaching cloud and mist, I went down to the lake edge, and, lying on my face in the mud, tested the water's qualities. It was fresh water, certainly, but the flavor—! Thirsty though I was I could not bring myself to drink that foul liquid. I turned and beheld Elna watching me from a little distance, in the diffused light of the hidden moon. How unutterably lonely that shore looked! It was enough to strike terror into the heart of the strongest man, let alone two beings accustomed to the refinements and polish of unguessable ages of evolution and experience. Left alone there amidst the wilderness of the unknown, it came to me more clearly than ever before that education is an error in many ways. It had bereft both Elna and me of all knowledge of fighting instinct, or how to meet brute with brute.

I was soliloquizing thus, and returning

to Elna, when I suddenly heard the dry beating of leathery wings above me. I looked up and simultaneously yelled out a warning. A vast shape, not unlike a monstrous bat, was outlined against the silvery mist. I caught a glimpse of a vile, wickedly hooked beak, and distended jaws. As fast as light the awful thing swooped from the direction of the jungle tree tops, straight towards the now desperately running Elna!

"Quick! Quick!" I bawled hoarsely, tugging at the ray-gun in my trouser pocket. "Lie flat!"

The mud hampered her movements, however, and mightily though I struggled through the ooze to reach her, I was like a crawling snail compared to the bullet-swiftness of the pterodactyl,\* for such I took this flying lizard to be. To my horror, I saw it sweep down in a graceful curve, seize Elna by the shoulder of her silk blouse—and flesh as well for all I knew!—and lift her, struggling and fighting, into the air.

"Great God!" I breathed, and felt cold sweat pour down my face in the passing frightful terror of that moment. I have often lived it over again in my dreams since.

THAT infernal ray-gun of mine came free at last from its special pocket in my trouser leg, but now I dared not to focus it upon the rapidly receding pterodactyl for I should, trembling as I was, disintegrate Elna at the same time. . . . Then, with a curiously musty odour, the flying horror veered off over the jungle.

I stared dumbfoundedly after it, then my gaze became fixed—for, just as it was about to vanish from sight over the tree tops I distinctly saw the dangling figure of Elna drop from its jaws and

\* Since the pterodactyl was the product of the Jurassic and Cretaceous Periods, I am inclined to think this creature was some kind of pterodactyl prototype, or else unknown altogether to science in later ages.—G. L.

disappear in the foliage of the topmost branches! For a space the monster circled with an angry beating of wings about the impregnable foliage, through which it was too big to penetrate; then, evidently sighting me with its astoundingly keen eyes, it made a sudden swoop in my direction.

I acted half mechanically in the succeeding moments of terror. Even as I saw the glint of terrible teeth in the distended jaws I sighted my disrupter full upon its hurtling form. Calling into being all the steadiness I possessed, I focused and fired.

Instantly a blinding ray of light stabbed through the moonlit gloom towards that flying five-foot of armoured toughness. Came a sudden loud explosion that echoed resoundingly in the rather dense air—then I looked for the thing again. It had vanished! With the explosion, it had disintegrated into atoms. . . .

I took a deep breath, thrust the ray gun back in my pocket, and squelched off as rapidly as possible to the forest to find Elna, if indeed she still lived.

Fortunately, I had made a mental note of the tree in which she had fallen—a towering monster with two upper branches reaching out like titanic arms to the swirling grey scum of sky. Without a moment's hesitation I began to climb the tree, tearing my clothes and flesh on three inch thorns in the doing.

Up and up I went, hand over hand, calling her name as I did so, and finding my heart sink as there came no reply. I tore away leaves with an intense fury that they should dare to block my path, barked my knees and elbows in my scrambles, until at last I commenced to reach the thinner regions of the topmost heights. Once, an affair like a foot-long centipede scuttled across my vision, and was gone. What it was I never discovered.

At last I found Elna. She was lying inert in the crotch of two immense branches, their natural, pronged shape gripping her about the waist, but leaving beneath her feet a sheer drop of thirty feet into a leafy abyss below. One of her hands was clutching a branch above, the other was dangling limply behind her. From her general attitude, and the closeness of her head to the main tree-trunk, I imagined she had made a desperate effort to save herself falling, had succeeded in fact, but had stunned herself in the doing.

Edging forward carefully, and bracing myself in the branches for the effort, I managed at length to haul her free. My balancing act was dangerous work; one slight miscalculation could easily have hurled us both into the foliage beneath. But by dint of clutching her under one arm with one hand, and hanging on to the tree with the other, I at last succeeded in bringing her to the comparative safety of the main crotch of the tree.

Her shoulder was bleeding freely, and the silk blouse was practically torn to shreds. I thanked the fates that had prompted her to wear that flimsy garment, for beyond all doubt she owed her escape to its parting under her weight. Carefully I set to work to bandage up the wound, and as I did so she began to recover consciousness. At the sight of me she murmured a low expression of thanks.

"What happened, Sandy? I—Lord! My shoulder!" She winced and bit her lip to stifle an exclamation of pain. Then with another grunt of discomfiture she rubbed the back of her head tenderly. "Always in the wars!" she said, with an effort at a smile. "Oh, yes, I remember now what happened. My blouse ripped and I fell down here, leaving our charming visitor with a mouthful of silk and, from the feel of my shoulder,

several inches of first quality female flesh. I clutched at the branches as I fell but toppled backwards and hit myself such a whack . . . H'm—I don't know what happened after that."

Briefly I explained to her how the tree branches had saved her from disaster by gripping her waist. She smiled faintly and held the torn shreds of shirt I was using for a bandage more closely to her bleeding shoulder.

"Well, all in a day's march!" she said sombrelly. "But Lord, how my shoulder hurts. It's more than a mere bite, Sandy; it stings as though my arm were being pulled off."

I looked at the wound closely in the moonlight. It was unpleasantly inflamed. I hesitated to tell her my innermost thoughts.

"Well, what's the matter?" she asked almost curtly. "You needn't try and hide anything, Sandy. I'm not a kid. What is the matter with my shoulder?"

"The venom in the pterodactyl's jaws," I said worriedly. "It seems that it has poisoned your flesh. Heaven alone knows what sort of filth those creatures feed on; naturally the bite has affected you."

"Better get down and bathe it," she said steadily, with another revelation of that calm, unshakable courage that made her so fine a companion. "No sense in sitting up here like tin gods." She spoke with effort; I think that shoulder was causing her far more pain than she would ever admit. She turned, wincing, to commence the descent, when I halted her with an exclamation.

My eyes, quite by chance, had become fixed upon something on the further shores of the lake, something distinctly visible from the elevated view of this horror-ridden land.

"ELNA, am I seeing things?" I asked at last. "Over there—on the lake edge—moving points of phospherence."

She looked in silence for a space, then nodded. "You're right, Sandy. There are six spots of luminosity over there, and they're coming towards us. There seems also to be like a thin streamer of luminosity extending from them to the distant mountain range behind."

"But what can they be?" I asked, rather absurdly.

"I'm not a magician, Sandy. Let's get down."

I went first in the descent and assisted Elna from branch to branch. It was hard going for her in her unfortunate condition, and the fear was obessing me that, if I didn't find something remedial before long, the venom would poison and kill her whilst I helplessly looked on.

At the base of the tree she sank down on the ground, exhausted by her experience and the ever-increasing stiffness and pain of her shoulder. We both sat still, oblivious to the dampness of the ground, watching those six luminosities approach.

From our vantage point the lights seemed to be moving slowly, but when I came to mentally compute the immense breadth of the lake, I began to realize that the strange objects were moving at something like thirty-five miles an hour. It was perhaps odd, the manner in which we sat and watched the things approaching, but to tell the truth we were so glad of the rest after our harrowing experiences, and so convinced that nothing could be more terrible than our present position, that we made no effort to escape.

The Luminosities came close at last, and quite distinctly we could see a thin streamer of light appended to them and reaching to the furthestmost edges of the lake's other side, wherever that might be. It seemed that in some undefinable way these bodies were con-

nected to some mysterious source or other. . . .

The first premonitions of some danger knocked at the portals of my reason. The amazing glow from the Things was of a curiously restful quality; very soothing to our overwrought bodies. There were six, as I have said, moving now around the bend towards us, at a slightly slackened speed, moving like five-foot, transparent candles of flame toward us.

Silently I got to my feet, and Elna did likewise. I put a protecting arm about her shoulders. As the Things came closer and closer—I at least felt a sudden mad urge to turn and fly blindly into the unknown forest behind, but something, even then, held me back.

"Are they alive?" Elna said in a low voice, her eyes chained to them, every little detail of her face lit up by their effulgence.

"If not that, they are at least intelligently propelled," I answered her. "They seem—"

Abruptly I ceased speaking. The entire six had come to a halt on the shore about eight feet from us. To gaze upon them was a most unusual sensation. Suspended there in the air, having no definite, definable form, seeming nought but some beautiful form of gas, it was an experience as singular as any I ever came across.

"They're watching us!" Elna said in amazement. "Sandy, I think I'm dreaming!"

She had hardly ceased to speak when we both fancied we heard a voice answer:

"No, you are not dreaming. Those upon which you gaze live, move, and have their being. Strange phenomena to you, but actually sentient entities. Life of the fourth planet come to end its civilization upon the third."

"Did—did you hear that?" Elna stammered; and I clutched her hand reassuringly.

"Elna, it may seem incredible, but I'm beginning to get the idea. These glorified Roman Candles are living beings. They spoke to us by thought; naturally their thoughts form into the words we understand. The fourth planet is Mars. They're Martians!"

"Now I *know* I'm dreaming!" Elna said. "Space-travel is impossible. Science has proved it."

"Impossible!" derided the mental voice of the tallest pillar of light. "Nothing is impossible! It is the will of the Highest that you come with us and explain the mystery surrounding you—the mystery of how two Earthlings of another Age come to be in the preprotoplasmic era."

I began to wonder myself if I was suffering from delusions. I knew life might evolve in strange forms upon other planets, but pillars of light were a trifle beyond even my scale of imagination. And again, what on earth had these intelligences in common with a young and terrible world? I remembered the last mental remark that the beings were "ending their civilization upon the earth." But why?

"That which baffles you will be explained by the Highest," came the thought-words. "Prepare for transition to our abode—you and your female counterpart."

At that Elna aroused herself from her pain to look transiently indignant. "Female counterpart!" she expostulated. "What do you think I am? An animal?"

"I have spoken," came the thought response. "Prepare."

Elna and I just stood there, not knowing what was going to happen. When suddenly a dense column of light streamed from the uncanny creatures and enveloped us. For my own part I



felt a sensation of comfort beyond all earthly parallel, and seemed to be buoyed upwards in a canopy of soothing light.

## CHAPTER VI

### The Luminous Intelligence

**I** HAVE reason to think that by some process of great intricacy—which later was explained—the Luminosities transferred Elna and me simultaneously across the primitive lake to a spot somewhere in the mountain range we had seen. However, the next thing we knew with any degree of certainty was that we were lying on our backs in something that felt like the softest down. All about us hung an iridescence of white rays, emanating from a source unknown.

I raised myself on one elbow and looked about me; then a voice in my mind said:

"Before you you will find food. Eat—you and your female counterpart. After that, sleep. I have willed it."

Elna sitting beside me, we found the food as promised on the ground before us, reposing in a bowl of curious bluish metal, and resting in the downy stuff in which we ourselves were enmeshed. Only too thankful to comply with the orders of the uncanny being—whose actual whereabouts we could not for the life of us discover—we ate the stuff. It was beautifully sweet and palatable, having the curious quality of both satisfying hunger and slaking thirst simultaneously.

When we had concluded, the voice in our minds spoke again.

"Man, your female counterpart is suffering acutely from a wound in the shoulder. By degrees that wound would get worse until your female counterpart died of poisoning. So be thankful to the intelligence of another world that you were both discovered by the

detonation of your interesting toy, the atom disrupter. I command that your female counterpart no longer suffer—that she shall no longer call her admirable courage into being to shield from your blind eyes the tortures of the monster's venom. I command that the wound cease to be. Begone!"

With the ceasing of the peculiarly worded communication I turned to look at the astounded Elna; and before my eyes, in the odd light, I distinctly saw a thin streamer of light writhe forth from the all-surrounding radiance and touch her flesh. In an instant that ugly, bleeding gash on her shoulder had gone; was as if it had never been. Instantly the drawn lines of suffering vanished from her mouth and round her eyes. She turned to look at me in dumbfounded amazement and lifted an investigatory hand to the now smooth skin. The light streamer faded and vanished.

"I—I felt it go!" she whispered, not unnaturally overcome by the almost uncanny power of the baffling intelligence.

"Sleep!" said the mental voice; and almost instantly we dropped into deep and singularly dreamless slumber.

**I** AWOKE again slowly, to the dim grey light of that early and incredible Age. Above me was the leaden, mist-smothered sky, but upon every side—slightly less luminous now, was that brilliant light that lacked a source.

Lifting myself on my elbow I found Elna just awakening a few feet away from me. We were both lying upon a mass of substance that looked like transparent feathers—a glorious filigree of gleaming, spider-web strands.

"Eat!" said one word in our minds, and once more we consumed a meal of that delightful stuff. This done we rose to our feet, and more from force of habit than aught else, straightened out our filthy, torn, and muddy clothes.

"You are wondering," said the voice, when we had finished, "who I am—who we are—and what we are doing in the age of the earth's dawn."

"It seems like a dream," I said, and evidently the spoken word carried sufficient mental impulse behind it to become intelligible to the all-embracing light.

"In your terms, I and my counterparts are of the planet Mars, I see you understand, is a planet many thousands of years older than the earth. It has been the lot of Mars, for many ages, to support life of our type by exuding from the dampness of its atmosphere a chemical quality upon which our gaseous forms thrive. Some time ago, however, that humid quality began to evaporate. The thing to do was to remove what remained of our race to this young world, and, whilst it continues in this humid state, continue our lives. When that humidity has gone—for it does not last long—we will either take the long journey into the infinite, or else move to yet another young planet. . . . We know it will not be long before this planet becomes capable of supporting the grosser forms of life. That will be our signal to depart.

"You and your female counterpart are products of a later Age, which, although quite advanced in scientific accomplishment, is but slight compared to the massed force of the intelligence of our planet. You, or at least your counterparts, understand the mysteries of time and space, otherwise you would not be here, millions of years back in the past. Mayhap, as time advances, your people too will merge into one—but being solid matter, by reason of the planetary conditions, that is not likely. Be it understood that we of Mars can either become independent units or one massed whole at will. Through the circumstances of our planetary conditions we have evolved into beings of trans-

parent gas, containing none the less, intelligent and far reaching powers. Mars, even at this stage, is an empty world—but the coming of ordinary man upon that planet is due to begin. That is, solid man. Ah! You wonder at our merging into one body? Let not that puzzle you, man. Gas can merge, where solid matter cannot. The words that come to you, are the concentrated force of four million individual units of intelligence, merged into a common whole, which to you appears nought but a wall of light. Were it necessary, the four million could split up into individual units, even as six did last night—but even so they would still be held by a gas line to the greater body.

"I have told you that your atom disrupter, or ray-gun, was heard. We had no intimation of your coming; so it was that we came to you and transported you to our little domain here in the valley of the hills, through the medium of paralleled interstices."

"Paralleled interstices?" I repeated.

"A process of which I fear you know nothing. It involves a complicated law connected with the varying forms of light waves, by which light waves are transformed into vibration, by inclining them at an angle to the rotation of the earth. In brief, the interstices of one place are made, by vibration of light, to change places with another. Hence, you were moved in space by what might be termed an invisible rod, the center of the rod having its location in hyper-space. The two points metaphorically swung round and instantly moved you from one end of the rod to the other—or rather from one place to the other. A fourth-dimensional pivot. . . ."

"Oh," I said, comprehending very feebly. Then: "My companion and I are marooned in this Age; we have no means of getting back into our own time. Do you understand Time well

enough to send us back to our home?" The luminous intelligence seemed to consider. "That could not be done," came the reply, at length, and I felt my heart sink. "You being solid matter, and ourselves gas, we are not trained to the transportation of matter through time. It would be impossible for us to so alter the time regulation as to transport you. From the standpoint of our mathematics, it would result in you and your female counterpart being dissolved. But, however, you need not fear. At some point in future time a man named Ino Carreno will discover how to conquer time. . . ."

"He did!" I exclaimed excitedly. "In the year 1980."

"From your standpoint he is past; from ours, he is to come," the mental voice said, and the oddity of the paradox impressed me. "However, that man will send forth a time machine into the past, fully equipped, as a test machine. The point in the past, to which he will send it, corresponds exactly with this Age and with this day. I have just computed the necessary mathematics that prove it. That machine will appear here for a moment, on the hillside there, which marks the spot where eventually Carreno will build his laboratory after thousands of years. We will attend to it that you safely board that time machine in the instant of time that it merges into this dimension. Be thankful that some force through the ages prompted the man Carreno—or will prompt the man Carreno—to send his machine back to this spot."

"Elna, it's a miracle!" I said in delight, turned to her.

"Not a miracle," she responded, in that practical tone of hers: "just mathematical coincidence, and very fortunate."

"It is not our will to retain you in this Age," said the voice again. "We seek nothing but our own intellectual

pursuits whilst the earth can support us. When Man begins to appear we will depart, for we have no wish to encroach on the rightful preserves of the real inhabitants. Man, perhaps, will carry our memory down through the ages, and so will spring up legends and tales of past beings, that in future time will seem to have no foundation."

"Great heavens!" I breathed, a sudden thought striking me. "Elna, we're gazing upon the source of Greek mythology, folk-lore, witchcraft, and a hundred and one other unexplained cults and sciences. . . ."

"You speak truly," assented the voice. "It is written in the Ages that we shall be spoken of; that men shall die for daring to utter legends of our having been here."

"Even in our time there are legends of beings who came with the clouds about their heads and whose bodies were made of light," I said thoughtfully. "Who can say but what the first men, glimpsing your wondrous forms, handed down the story from father to son, until in the printed world of civilized beings such stories are looked upon as legends? Privileged we are indeed to see you and know you for what you are. But tell me, All Highest, why do you call this,—er—lady companion of mine, my female counterpart?"

"Because that, in all truth is exactly what she is," came the answer. "We ourselves long ago evolved into the condition where the existence of two separate sexes was found to be unnecessary. We are a hermaphrodite race—we combine the two sexes in one, and multiply upon ourselves where necessary. That necessity is rare."

"Will such a thing ever come to pass upon the earth?" I asked eagerly.

"No. I can never foresee solid matter merging both sexes in one, unless the ordered processes of time ultimately

bring it about, even as in your age some plants are of the hermaphrodite species. . . . But the time grows short, man. You and your female counterpart must go to the time machine, before the exact moment is lost to you forever."

"ONE thing, before we go!" I exclaimed. "In my own Age of time I am fighting a man with thousands of years greater knowledge than my own. I fear for my people. Can you tell me what to do to overthrow him?"

"No. It is not our way to give counsel to men of another world; it too often leads astray. I can only see one thing in the future—a future so incredibly distant that even my massed intellect reels at the computation of it—and that is a vision of a galaxy unknown; the movements of a planet as yet unborn, and your own visage visible upon that planet. There you will meet a power that will dwarf anything you have ever known, an intelligence that will make our greatest efforts seem but the feeble efforts of an insect. More I cannot tell you. . . . One thing we will do for you. We will speed up the vibration of the time line so that your journey to your own Age will be rapidly accomplished. Without that you would take years to return, and die in the meantime. And now begone!"

And almost simultaneously as it seemed, due no doubt to that marvelous system of paralleled interstices, Elna and I found ourselves upon the hillside. Below, covering the entire valley floor, stretched a billowing mass of gently undulating luminescence, glowing beneath the grey and troubled sky. Intelligent life! Life in gas! I wondered again if I was dreaming after all—then a writhing appendage to the gas about the forms

of Elna and myself convinced me once and for all that it was truth.

"The time is nearly due," said the voice again. "High up on this hill corresponds with the height from the floor of Carreno's laboratory when he will project his machine, into time. Do nothing. I will set the controls to 2,000 A.D. Farewell. . . ."

Elna and I stood perfectly still. Then abruptly I felt a sudden whirling as though I were being pitched bodily through the air. I cried out, struck something hard, and then fell back in total darkness. Something moved beneath me. . . .

Came a streaking band of light from some point in space, then through the thick glass window I beheld the mad chaos of the Ages, enormously speeded up, against which the passage of my own beloved Liner 48 would have seemed the veriest crawl. I found that I was lying on Elna. With a profuse apology I helped her to her feet.

"This is the machine that has the accelerator," I said. "The one that was lost, and which, by some strange mathematical coincidence, we have found. . . . Maybe that's it," I said, and pointed to an unusual equipment allied to the controls.

"Don't touch anything!" Elna counseled, holding my arm. "The Martians said we were to rely on them."

I dropped my hand. "True enough. Thanks for reminding me."

I looked around in the yellow light of the hurtling sun, and then glanced at the dials and recording instruments.

"The Highest has kept his word," I said quietly. "He has turned the machine back in time and we are hurtling towards 2,000 at a speed beyond compute. . . ."

# Older Than Methuselah

*We have had a number of stories about the fabled Atlantis, but Atlantis was not the only community we are told about that fell a victim of the great master of us all—Time. Here we have another city of which much has been told and which appertains more to the Pacific Ocean than to the Western Sea. Mr. Coblentz is one of the favorite authors with our readers and he lives well up to his standard in this story.*

By STANTON A. COBLENTZ

THREE years ago, when my bride, Muriel, and I set off on a honeymoon flight to the South Seas, we had no premonition of the evil events ahead.

As an experienced aeronaut, physicist and inventor, I had every confidence in the *Stormy Petrel*, a flying craft of my own contrivance; and it had never occurred to me that I, Owen Hornwell, world-famous pilot, might go down to failure in the most important expedition of my career. Yet, from the beginning, our voyage was to be chequered with disaster.

On a clear October morning we put forth from the airport of Oakland, California, and within a few minutes had launched ourselves above the blue reaches of San Francisco Bay and oceanward across the tapering peninsula of San Mateo. Having been married only the day before, and being very much in love, we were in the best of spirits; and I well recall how we joked and jested while I turned the pilot-wheel in our little noise-excluding compartment. . . . "We can make better than two hundred miles an hour," I remember saying. "Within twenty-four hours we'll be at Tahiti, where we'll live a regular Robinson Crusoe life."

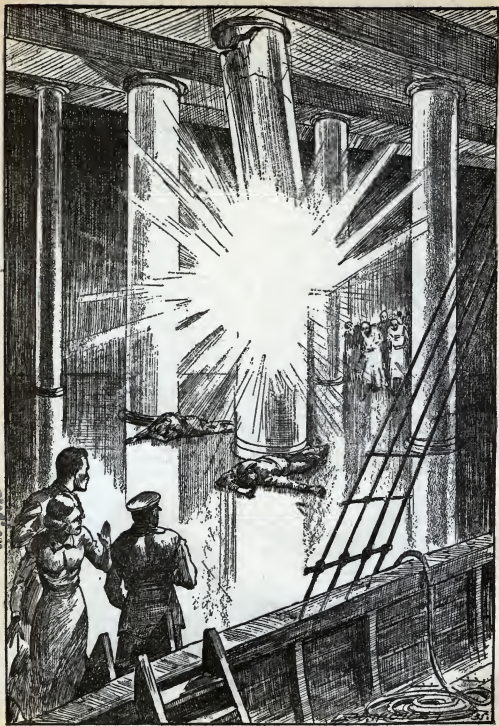
But nothing so tame as the life of Crusoe lay in store for us. That very

night things started happening—and it was to be long, long indeed, before they were to cease to happen. In order to push on to the more important events, I shall skim over our first adventures, although they were exciting enough to have deserved several chapters. . . .

Only a little after sunset, a heavy rack of clouds arose, accompanied by tremendous gusts of wind. Losing our way amid the obscurity, we were driven southward far out of our course. Both of us put forth every effort to save ourselves (for Muriel, under my tutelage, had become a fairly accomplished aviatrix). But our very struggle to regain lost ground proved our undoing. In our haste, we put an excessive strain upon the engines; and at the hour of our greatest trial there came a sudden terrifying thud, the motors stopped as though stricken with heart failure, and our ears began to hum and buzz as we went dipping through the darkness.

Except for swift action, which temporarily revived the motors and allowed us to settle seaward gradually, we would have been quickly engulfed. As it was, we managed to gain a resting place on the waves (the *Stormy Petrel* being equipped to float); and, though threatened by the heavy seas, we contrived to keep above water until dawn, when the storm gradually subsided. . . .





*Then, just as we reached the vessel, the most powerful bolt of all boomed against the cavern walls.*

I SHALL skip over the harrowing period that followed. A day, two days, three days went by, while, feverish and with aching heads, we drifted helplessly and exhausted our reserves of food and water. We were quite prepared to die here amid the wilderness of salt waves, and told ourselves, as placidly as we were able, that only a miracle could save us. Yet I shall never forget the joy that leapt to Muriel's deep blue eyes and overcame her flushed cheeks when, on the fourth day, the miracle actually came to pass. It took the shape at first of something small and gray heaving slowly toward us over the whitecaps; but after a time it enlarged itself into the outlines of a little craft, with four oarsmen in control; while far away, two or three miles to leeward, I could make out the black hull and tall masts of a fairly large ship. . . .

Half an hour later, still faint and ill and half delirious, we found ourselves being supported up a Jacob's ladder to the deck of a scarred old sailing vessel, that had a peculiar, evil odor that I shall never forget. I do not know whether it was the rousing effect of this unpleasant smell, but for the first time since our rescue I felt somewhat revived. As we mounted to the deck, I saw the ship's name, in ancient half-obliterated letters: the *Sea-Dragon*; I caught a glimpse of her great, towering masts, her rusted anchor chain, her decks tangled with grimy masses of rope and penetrated by black, sinister-looking hatches. But most clearly of all, I observed the human freight, which was crowded curiously on deck. What thickly bearded, loutish, uncouth faces! What piratical-looking, dark eyes! What coarse and deeply seamed countenances, tattooed with wild and barbaric figures and seared and criss-crossed as by a thousand battles!

Amid this rascally-appearing mob, a ponderous form came shoving forward,

while the others made way with a cringing fright. Gorilla-like in build, with something of the gorilla's barrel frame and long drooping arms, this stranger gave the instant impression of power. His face, with the square jaws, the wide mouth and prominent cheek bones, had a bony appearance that made me think of a cave man; while about his whole personality there was something so hard and cold, that I shuddered as though he gave forth icy emanations.

Perhaps this was but a delusion sprung out of my fever, yet Muriel was affected in much the same way; she trembled and crept close to me, clutching my arm as if for protection, though no one had made a move to harm her.

In the events following, there was nothing to justify suspicion. We were cared for in a rough-and-ready but not unkindly way; were provided with some salty food smelling of fish-oil, and with a tumbler of brackish water each, and were offered quarters up to the meager best that the vessel afforded. And then, when we had begun to feel just a little more cheerful, the first of many successive blows descended upon us.

"Damned if I know what to do with you!" ejaculated the Captain, in a peculiar chilling accent, while he stared at us from beneath bushy brows with dull ape-like eyes. "If Mike O'Harvey here"—he indicated a man a little more prepossessing of appearance than the others—"if Mike O'Harvey hadn't a-seen you way off to starboard this morning, you'd be food for the little fishes. By the skin of the devil, mates, I don't know why I took you aboard! A whaling barque bound for th' Antarctic ain't exactly no place for ladies!"

"A whaler—bound for the Antarctic!" I echoed, feeling faint and sick again.

"Where in hell d'y' think she's bound for?" snapped our new acquaintance. "The North Pole? Not back again for

two years, neither, at the quickest reckoning!"

As these words fell upon me, everything went black before my eyes. There followed an interval of blankness; and, when I came to myself again, I was lying in a heaving bunk, and a sailor, with a red scar across his face, was pouring a burning liquid between my lips from a chipped yellow mug.

## CHAPTER II

### In the Grip of the Invisible

**A**GAIN let me hasten over a series of events, in order to come the sooner to the extraordinary episodes ahead.

Within two or three days, Muriel and I had about recovered from the shock of our adventure. Arrayed in a greasy, old, sailor's costume, I had been impressed into involuntary work, and officiated at scrubbing decks, polishing brass, or standing watch through the weary night-hours. As for Muriel—there was pathetically little for her to do, except to act as seamstress for the men, or else, with an expression of unutterable sadness, to gaze out wistfully across the unending gray-green of the waters.

Thus day after day went by, while the vessel forged slowly southward. Day after day, and only the interminable salty waste met our eyes . . . until at last we had drifted almost within sight of the Antarctic Continent, and the frigid air hinted of the land of perpetual ice. Meanwhile our master, Captain Hawker, had put the harpoons and whaling tackle in readiness; and, with no intention of treating us to a glimpse of Antarctica, began to cruise due west, in the hope of surprising some stray leviathan. But never a whale, alas! were we to behold.

Instead, far stranger sights were to confound us.

One morning, when we lay becalmed, a faint and at first nearly imperceptible southward drift began to be noticed in the vessel, whose bow gradually turned toward the Pole although guided by no turn of the helm. In the beginning, we took little note of what seemed a mere whim of the currents; but what were we to say when the schooner glided with slowly accelerating speed through waters where there was neither tide nor wind?

To report that we were startled would be to understate. We were panic-stricken; our hair commenced to bristle on our heads. Memories of Coleridge's ill-fated *Ancient Mariner*; memories of "The Flying Dutchman" and other weird legends of the sea, flashed into my mind, although I tried my best to laugh them away. And my misgivings were not relieved when I saw the Captain stamping angrily across the deck, bawling out orders which the seamen strove vainly to follow. "Heave to there, boys! Heave to! Haul up sail! Heave to, or I'll beat the last mother's son of you into puddin' an' jelly!"

But rave as he might, his words were to have no effect. With sails tightly furled, while the helmsman battled desperately to reverse our course, the vessel proceeded on her inexorable way southward. There was still no breeze stirring; there was no current to carry us onward; but our bow continued to break the waves at a speed that increased from four or five to eight or ten knots. It was as if the ship were caught in the grip of some invisible giant, which drew her across the waters like a toy boat.

Long before noon, we had ceased to fight against the unknown menace. Mumbling inchoately beneath his breath, Captain Hawker paced up and down, up and down, with the air of a man bereft of his senses; while the crew,

left to their own devices, stared moodily out across the waters . . . some of them crossing themselves and muttering prayers, some of them cursing with frightened zest, one or two peering continually at the compass, which still showed us moving due south.

"DAMNATION blast my brains," the Captain at last broke silence, glaring in my direction with a peculiar superstitious malevolence that numbed me like a chill, "damnation blast my brains if I don't know now what did this! It's because we've taken a low sneakin' cur of a land dog aboard! I knew we oughtn't a done it!"

Though I attempted no answer to this preposterous charge, the Captain still glowered at me malignly, and from that time forth, I know, never ceased to look on me with hostility, since somehow, in the twisted recesses of his mind, I was connected with his misfortune.

Meanwhile our condition was changing from bad to worse. By early afternoon, scattered ice-floes were drifting all about us; and the white outlines of a distant hilly coast began to be visible. Toward this we moved with increasing speed, while the hills expanded till they took on the dimensions of tall mountains. So deceptively great was the distance, however, that the long Antarctic afternoon had passed before we drew near to land and began to glide into a long narrow bay between ice-coated cliffs: a sort of fjord which extended inland for miles and bade fair to splinter our ship against its precipitous shores.

As if to deepen the horror, evening had now settled about us; and the uncertainty of twilight was followed by the dreadful blackness of a moonless night. And still we made our way through those mysterious waters, expecting at any moment to founder upon

a hidden reef or unseen, lowly islet.

The ship's few scanty lights, green and red and white amid that coal-black immensity, seemed but to emphasize the ghostly terror of our plight. And the dim starlight, casting its reflection upon the towering, barely perceptible shoulders of snow-mountains, had an unearthly, phantasmal effect.

But after a while, even the comfort of the starlight was to fail us. With unspeakable terror, I noticed how narrow a ribbon it made, and how the walls of the fjord, growing ever higher about us, seemed to be drawing together as if to meet above our heads. Even as I watched, the line of the stars grew thinner and thinner . . . until all at once, as though a curtain had been pulled above us, they vanished utterly.

We could still hear the swishing of the waves, as we moved rapidly through the waters; but the blackness was unbroken except by the spectral-pale lights of our vessel.

### CHAPTER III

#### A Port of Ill Omen

IT SEEMED that hours dragged by while we floated through that tar-black immensity. Yet probably it was not many minutes, as the clock measures time, before the first reassuring sign came to us out of the gloom ahead. As when one rides through a long railroad tunnel and at length sees a welcome point of light beyond, so we were greeted by a pale glimmer far in the distance. We were coming once more to the open sea?

But no! as the light gradually expanded, it assumed tints that surely no mariner ever beheld at sea! I find it difficult to describe that pearly luster, that milky opalescence, which, taking on an oval shape and slowly enlarging, shone directly ahead, casting a phos-

phorescent glow on the shimmering waters, and by degrees revealing a cavern with roof hundreds of feet above us, and rugged walls a quarter of a mile to either side. Weird as a scene on the moon it seemed; and all of us, from the Captain down to the meanest seaman, stood watching in speechless wonder and apprehension.

Even if we had had any hope of emerging into the open air again, that expectation would have been dispelled by the rising thermometer. For it was as if we were rushing back to the tropics. The atmosphere, hitherto so chilly as to necessitate oilskin jackets and fur mittens, was growing humid and heavy, compelling us to throw off our outer garments while oppressed with a languor as of a jungle swamp.

"Holy Smoke, we're going right down to the furnace room of old Nick!" rasped the astonished voice of the first mate, Tim Gilhooly. "Make ready, boys! Here's where you smoke for your sins!"

Frightened oaths and mutterings proved that he was not alone in this view.

By this time the opening ahead of us had grown much wider, offering glimpses of waters glimmering with an argent pallor. Gradually we approached a huge stone gateway separating the realms of light and darkness, and found the *Sea Dragon* moving into a larger cavern,—a cavern incredibly strange and mysterious. Imagine an abyss so vast that its further walls are not visible, while the rocky ceiling arches above you at a height of eight hundred or a thousand feet. Imagine that from the ceiling, no less than from the nearer rocky flanks, a subdued chalky-white radiance everywhere issues as if from concealed luminaries. Imagine the ghostly effect of this luster enhanced by the blue-white coloration of the rock,

which, while free from ice, gives an ice-like impression. Imagine that even the waves beneath, opaque and murky, despite the twinkling on their surface, further the suggestion of things ghastly and sepulchral. Imagine that as your vessel moves forward apparently of its own accord, it makes for a little crescent-shaped bay, beyond which, at regular intervals, loom great stone columns that taper toward the roof. And imagine finally that the ship, with slowly diminishing speed, glides straight toward a dock of alabaster-like stone, placed as though by invisible hands to receive it.

Imagine all this, and you will have but a faint idea of the astonishment, the bewilderment, the dread which we all felt, as we saw ourselves approaching that unknown port—which, without needing to be told, we instinctively felt to be a port of ill omen.

ALTHOUGH not a moving thing was visible ashore, we had the feeling that unseen eyes were watching us, unseen hands guiding our course, as we drew near the alabaster dock. And when at length the vessel shuddered to a halt, and little automatic steel rods shot out—as if under intelligent control and moored the ship to the pier, we could no longer doubt that we were the victims of some designing force.

So hopelessly trapped did we seem that the thought of escape scarcely entered our heads. We merely stared helplessly out at the feebly tossing opalescent waves and at the milky white landscape with the weird, tremendous columns; and each read in his neighbors' eyes the horror that distended his own. "By the teeth of the sea-serpent!" rumbled Captain Hawker. "We're caught in the devil's own claws!"

Even as he spoke, there came a startled shout from one of the seamen. And all of us, turning in alarm, beheld



a sight that seemed to justify our fears.

From behind one of the great stone columns, half a dozen singular beings were emerging. Or were they breathing creatures at all? My first impression was that I was looking not on the living, but on the departed. I seemed to be gazing at walking dead men!

Did you ever consider how an Egyptian mummy would look, if, after thousands of years in the tomb, it could be brought back to life? With the withered parchment skin that resembled a dried apple; with the discolored clothing literally falling to pieces on the shrivelled body; with the features deeply sunken and the bones projecting from beneath mottled brown cheeks; with teeth and hair missing, with a cadaverous grin upon the bloodless lips, and with lackluster eyes peering out like dark holes from gaping sockets, it would be more hideous than the monster of a nightmare. Yet it would be no more repulsive than the strangers that moved slowly toward us from behind the stone columns.

Little wonder therefore that, after the first astonished glimpse, many of the crew could not restrain their terror. Little wonder that several, leaping to the dock, started away as fast as their legs would carry them. Little wonder that others, with the dread cry, "Ghost! Ghost! Ghost!" followed in rapid succession, until a panic had swept them all, and every member of the Company, down to the Captain himself, had dashed away in a wild stampede.

Unnerved by our recent adventures, I too might have joined the fugitives—had I not felt a small hand tugging at my arm, and looked down to see two eyes pleading reproachfully.

"What is there to fear, Owen?" those eyes seemed to ask. And I drew Muriel close to me, resolved to hold my ground.

Now, as I stood with her on the

gently tossing deck, I saw that the newcomers, after all, did not appear menacing. Despite their extreme old age, they certainly belonged to this world and not to the next. Three men and three women, their ancient necks stooped and their spines bent to resemble the crescent moon, were tottering toward us with such feebleness that a wind might have blown them all over!

Their intentions, moreover, appeared amiable enough; the hideous grins that distorted their features were meant not as threats but were smiles of welcome. Indeed, as they drew nearer, I perceived that they were actually delighted at our coming; for the words which they mumbled to one another, while unintelligible to us, were accompanied by joyous smirks and chuckles.

By the time they had panted to within arm's length of the ship, we received almost the greatest surprise of all.

"GOOD day, my friends!" the foremost of them greeted us, in tones quite understandable, though with the oddest of foreign accents, and with a slightly archaic turn of phrase. "Pray consider yourselves welcome!"

"What!" I gasped, as soon as I could recover my breath. "You—you know English?"

"A few of us do," was the calm reply. "But it is a strange and difficult tongue. Some of your ancestors were down here and taught us a hundred years ago."

"A hundred years!" echoed a second of the desiccated creatures. "My dear man, you must be losing your memory. It's a good two hundred, if it's a day!"

"Two hundred!" I flung back, in unbelieving surprise. "You must be older than Methuselah!"

"Yes, much older!" My informant stared at me with rheumy eyes, from which the last spark of life seemed to

have faded; and his frail shape, which looked a mere bag of bones, quivered like a leaf, as he was racked by a convulsive cough.

"Much older than Methuselah!" he reiterated. "Only last week I was condoled on my thirty four hundredth birthday. My grandfather here"—he pointed to another individual looking not a whit more withered—"is nearly thirty-four hundred and seventy."

I could not help admitting to myself that both men looked at least thirty-four hundred years old; nevertheless, I still smiled incredulously.

"I see you doubt us," continued my new acquaintance, in offended tones. "However, wait till you have heard all! We dwellers in the abyss have many faults, but truth has always been one of the virtues of the Children of Mu."

"The Children of Mu?"

"Yes, Children of Mu, the great continent engulfed by the Pacific more than 3300 years ago. Shall I continue?"

"Of course! Go on! Go on!"

Our informant looked about him a little doubtfully; shivered a little, coughed once more, and then declared, "I'd be delighted to—under suitable circumstances. But first suppose we go indoors. Don't you think it's a little chilly out here?"

A glance at the ship's thermometer showed the temperature at 88!

"Oh, very well," I grumbled, motioning them into the vessel's cabin.

"No, no, you come with us," they protested, pointing toward one of the great stone columns, in which I observed a little door-like opening. "You must meet our leader, the Father Supreme. Besides, we want to make you nice and warm!"

Naturally, I hesitated to accept this invitation; for, aside from the fact that I was "nice and warm" enough al-

ready, I disliked to leave the ship that constituted our one link with the world.

But the aged son of Mu seemed to read my unspoken objection.

"Fear not!" he soothed us. "No harm will come to you! You are in our power, whether you wish it so or not, but we intend you no harm."

And, as if to demonstrate that we were indeed in his power, he extracted a small pistol-like implement from a fold of his crumpled brown garment, and instantly a bolt of forked blue lightning shot upward, with detonations as of thunder. "You see, we have powers that could scorch you to cinders. The electrical energy displayed by this bolt was supplied by the disintegration of a few atoms of lead—an amount far too small to see with the naked eye. We could do much better than this, if need be. But I trust we will not have to resort to unpleasant methods of persuasion."

As he was speaking, I felt Muriel press close against me for protection, and read the terror in her distended eyes.

"But what of my shipmates?" I demanded, feeling an unexpected tenderness for Captain Hawker and his crew. "I can't leave them here without a word."

"Oh, never mind them," returned our chief captor, with a cackling laugh that sent cold shivers running down my spine. "They too are in our power. We will come to them when we need them. Are you ready?"

There being nothing else to do, I nodded; and, with Muriel clinging to me in dread, began following the venerable Children of Mu toward their underground headquarters.

As we accompanied them at their mile-an-hour pace, I caught glimpses of Captain Hawker and several of the men, who were peering cautiously from be-

hind the stone columns, still with the expression of beings who have looked on ghosts.

## CHAPTER IV

### The Trap Begins to Close

**H**OBBLING through the door at the base of the stone column, our guides led us down a curving gallery constructed of the same icy blue-white material as the cavern walls, and illuminated indirectly with a cold and ghastly radiance. But what struck me most disagreeably was the wave of intense heat that swept upon us as we entered. It was like the blast from a furnace!

Yet apparently our companions found it not unpleasant. "Ah!" they grunted, turning upon us with hideous grimaces intended as smiles. "Ah, now we'll be warm once more!"

And they rubbed their shrivelled hands together as if to restore the frozen circulation.

It was only a few yards to the end of the curving gallery, where we saw some little wheeled cars, each large enough to contain a single person, and each fitting into well oiled grooves, which descended into a blue-white lighted tunnel. "Get in," prompted our guides. "The reception hall is eleven levels down."

Recognizing these cars as the equivalents of our own elevators, we did as bidden; and a few minutes later, after a swift descent, came out into an enormous chamber with amber-colored walls, where a multitude of the natives waited to receive us.

But what a grim, repellent crowd it was! To me it seemed, at my first astonished glimpse, as if all the concentrated ugliness of the planet were gathered here. Surely, even Satan and his fiends could not have been more

loathsome! For none of the people looked any younger than our guides. All were mere walking mummies, with cracked parchment cheeks, leering dried-up faces, wrinkled bald pates and toothless gums. Not a sign anywhere of childhood or youth! Not a sign of vigorous maturity! It was as if death had put his seal upon all these beings, claiming their minds and limbs and spirits, and leaving their desiccated corpses to limp about with the mere blind semblance of life.

Upon our arrival, they set up a great gabbling and cackling, pressing about us with a gibbering curiosity, and muttering to one another in some unintelligible tongue. From the excited gestures of their long withered arms and the shrill, peculiar cries which many of them set up, it seemed that our coming was the occasion for general rejoicing.

While we stood sweltering in the steamy atmosphere, one of the most ancient of the crowd approached—a man so aged that one wondered how his paper-frail body was able to move at all. His face, crisscrossed with scars and very deep creases, was irregular as the landscape of the moon; his eyes were barely visible slits beneath the rumpled skin, and one of them seemed completely closed. Yet he seemed to command especial respect, and all the people bowed and made way before him.

"My friends," he shrilled, speaking a hesitant English in a thin piping voice that, now and then, rose out of control, "Give heed to me! Give heed! I am the Father Supreme! It is my place to welcome you, and to explain why you are here! Come! make yourselves at home over in that nice, warm corner!"

With the manner of one doing us great honor, he tottered to a bench at

one end of the hall, where the temperature, to judge from the perspiration that dripped from me in streams, must have been above a hundred.

When we had all taken seats, and he had adjusted a worn shawl about his drooping shoulders, the Father Supreme gave a mumbled order; and immediately all the people except three or four left the room.

There followed a recital which, delivered with many pauses and interruptions, held us fascinated despite the stifling heat. I could not, if I tried, reproduce the story in the Father Supreme's broken English; but as nearly as I can, I shall give its substance.

"**M**ORE than thirty-three hundred years ago," he began, "the Continent of Mu was the most civilized country on earth. Its art, literature and philosophy were the most advanced our planet had ever seen; while its particular pride was its science, which I shall shortly describe. But alas! powerful as we were, we were not strong enough to resist the inroads of nature, nor to check those cataclysmic eruptions which were to submerge our land. The most that we could do was, by means of geological investigations, to foretell the calamity, which was due to the growing pressure of layers of steam and magma just beneath the earth's crust. I well remember that I, then a young engineer in my thirty-seventh year, computed what was to happen, and warned my fellow countrymen."

The speaker paused, shivered a little, drew his shawl more tightly about his shoulders, and continued:

"Of course, only a few would believe me. For twenty years I raised my pleas, which, though supported by leading scientists, were greeted with contempt by the rank and file. My claim was that the disaster was still a generation

away; and that our only salvation was to take whatever we could save and emigrate to the Antarctic—then a warm and fruitful region. At last, in the year 55667—about 3340 years ago—I organized an expedition of a few thousand Children of Mu, and sailed to form a colony in Antarctica. Our fellow citizens might refuse to believe, but we at least intended to save our lives!

"We settled in a green Antarctic valley, and, thanks to our scientific knowledge, were not long in making ourselves comfortable. We thrived, and increased in numbers—but it was only ten years later when, at the precise moment I had foretold, a severe shuddering of the earth accompanied by tidal waves and torrential winds bore us the tragic knowledge we had awaited. Our native land, with all its gorgeous accomplishments and all its inhabitants, had sunk beneath the Pacific!"

The speaker sighed, and bowed his head, as if too weary to continue.

"But how be sure?" I demanded.

"Broken wireless messages confirmed our belief. Besides, we sent an expedition in search of our homeland. All that we found was a few barren reefs and some drifting wreckage."

For a tense moment none of us spoke.

"But all that happened more than three thousand years ago? I objected, finally, with a return of my old incredulity. "And you say *you* personally were present?"

"Yes, I and most of my followers. "It's easy to see, young fellow, you come of an unscientific race, who regard a stripling of eighty or ninety as old. But if you'll give me time I'll make everything clear. The secret of our long life is to be found in an accursed fluid, the Cellular Elixir. This is itself a living substance—a compound of nitrogen, carbon, phosphorus, sul-

phur, oxygen, hydrogen and one or two other elements—a super-protein whose cells are not only self-perpetuating but act, by a sort of catalytic process, to perpetuate the activity of all other proteins. It is accordingly a substance which, entering and regenerating the blood-stream, acts to rebuild exhausted protoplasm by continually renewing the worn-out cells. Therefore, since no organ can ever break down altogether, we can permanently avert that decay which results in death. In a word, we can live forever.”

“WHAT! Live forever?”

“Yes, forever. You see, the Cellular Elixir was known in Mu long before the submergence; but an old law forbade its use under dire penalties. After our emigration to Antarctica, however, there was no longer any authority to restrain us; and so we hastened to taste of the forbidden fruit. It was all so easy, you see! The substance could be plentifully made from a formula in our possession—a formula which, unhappily, has since been lost; it could be applied by means of a simple hyperdermic syringe; and one dose weekly would suffice to keep any man alive. Such was our belief as we all rushed to this glorious fountain of life. Little did we realize what a trap we were laying for ourselves!

“But before telling of that, let me go back and describe another extraordinary transformation. Although never able to trace the connection, we believe that the cataclysm which destroyed Mu was somehow related to the shifting of the earth’s axis and the settling of the Polar cold about Antarctica. Almost immediately after the former catastrophe, the latter began to be noticeable; we were overwhelmed by tremendous sleety storms; the summer days became longer and the winter days

shorter and much colder; the very vegetation began to change, and the grasses and lichens of frigid regions by degrees replaced the trees and shrubbery of temperate climes. In short, our new home had become uninhabitable.”

“There were now some who urged emigration to northerly lands, and this was wise counsel. But again the curse of our science was upon us. Many of our number upheld an alternative plan, which had the merit of novelty and originality, and did not necessitate the wearisome search for new lands. By the shades of our ancestors! how we were setting the noose about our necks!”

Once more the speaker paused; and, glancing about him at the amber-tinted windowless walls, made a wry expression with his toothless jaws, and continued:

“Unfortunately, we were so far advanced scientifically that we could work seeming miracles with ease. By releasing the inter-atomic energy in a single pound of ordinary earth, we could blast out thousands of cubic yards of rock, excavating these enormous galleries which you behold. By the same means, we were able to sink shafts, scores of miles deep, to tap the earth’s internal heat, which would be conveyed to us by great pipes, providing an automatic and unfailing source of energy, which would endure for thousands of years, needing to be renewed only when the self-perpetuating machinery had finally broken down. A by-product of the same development was a ventilating system, as well as energy for the synthetic manufacture of food from water in combination with the carbon and nitrogen of the air and the phosphorus, sulphur and other ingredients of the soil. Alas! This very knowledge was to prove our curse.

“For, having walled ourselves in, we could not escape. Having solved the



riddle of perpetual life, we found only perpetual misery. I could not begin to tell you, my friends, how dreary our existence has been—seeking nothing, enjoying nothing, accomplishing nothing—no new faces, no new experiences, not even a child born for thirty-three centuries! Besides, the Cellular Elixir has one unfortunate drawback, for some reason we have never determined, it does not act on the glands as effectively as on other organs, and so does not stop us from getting older. It merely prevents us from going to our natural rest."

"But why live, if life be worthless?" I found it on my lips to say. And the old man, as if reading my thoughts, hastened to explain, "The irony of it all is that, the longer we live, the more we fear to die! It is as though, having cheated the grave, we dread its revenge. Heaven knows! death would be welcome enough, yet the more we put it off, the more afraid of it we become. There isn't one of us to whom the thought of dying isn't a perpetual nightmare."

Trembling violently, he turned from us, his face convulsed with horror.

"NO, my friends," he continued, "we cannot bear to die! We must not, must not die! That is why we have lured you here."

"We? What have we to do with it?"

"It did not have to be you in particular. For three hundred years we have set a trap for any ship, by means of a material known as carbomagnum, which exerts a compelling influence upon all organic substances including wood, somewhat as a lodestone does upon iron. The principle behind it has never been fully understood; but who, for that matter, knows the exact *why* of gravity or magnetism? At all events, any vessel entering the circle of attraction would be drawn to our land, through an especially prepared channel. This explains

the arrival of an English crew, from whom we learned your language a century or two ago. They would have served our purpose, the scoundrels, if they hadn't all chosen to escape. We never could understand why they killed themselves!"

"Killed themselves?" echoed Muriel and I in one voice; and we glanced at one another and shuddered.

"Yes, killed themselves," repeated the Father Supreme, with an odd, sinister emphasis. "We trust you will be more sensible."

We sat staring speechlessly at our companion's cadaverous face.

"What we require is nothing very hard," he went on, after a pause. "Nothing that you cannot give. What we need down here is new blood. Our engineering and heating apparatus, timed to work automatically for thirty-three or thirty-four centuries, will have to be renewed in a few decades more. Hence we Children of Mu are in a predicament. In these last millenniums we have grown indolent, and have forgotten how to run the machinery. We have lost the very secret behind it. Consequently, we must have the aid of fresh minds, with fresh power and ingenuity."

"Ah, now I begin to see!" I exclaimed, though still far from guessing what had led the English crew to suicide. "So you want us to restore your engineering works?"

"That's it—in part," he admitted. And then with a peculiar, ominous emphasis, "*In part*. But there's another service—an equally important one—which you can perform. You can help regenerate our race."

"Regenerate your race?"

"Of course. You see, we have become decrepit. Perhaps you have noticed that. But although sterile among ourselves, we believe that, aided by the Cellular-Elixir, we might produce fresh

progeny, if mated with robust young blood. Now you begin to understand?

The Father Supreme sat leering at us like a vampire bat. All too well we began to understand!

"Each of you will be vastly honored," he went on, grinning. "Each of you will have a Child of Mu as his spouse!"

Then, after a pause during which his skeleton hand rubbed his bony jaw with every evidence of satisfaction, our antique host leaned toward Muriel with a smirk; and, as she withdrew in revulsion, announced:

"For my partner, I choose this fair young lady. The celebration will take place as soon as I have been a bit re-animated."

With a gasp of horror, Muriel huddled into my arms, while I, suppressing an impulse to strike down the Father Supreme for his insolence, returned as calmly as I could, "You forget, sir, that is impossible. The lady is already married—"

The would-be bridegroom eyed me with just a hint of hostility in his cold glance. Then imperturbably he continued: "Oh, very well. So we'll have to annul the marriage. No formalities must stand in the way of the future of Mu."

Thereupon, while I glared at him with intentions little short of murderous, he summoned three or four of his countrymen, who had been quietly seated at an opposite corner of the room. And, designating one of these, he turned to me with the following introduction:

"My friend, this is the lady, Mara Joy. As soon as arrangements can be completed, she will become your bride."

In consternation, I glanced at the lady, Mara Joy. She was no less withered than the other Children of Mu! Her crumpled form was bent almost double, like one of the witches of fairy lore; her haggard face was a mere dried-up mask; her chest was flat as a board, her

underlip showed a hairy protrusion; she gibbered inanely as, reaching out her bloodless arms in gestures doubtless meant to be tender, she prepared to receive the embrace of her future mate.

## CHAPTER V

### The Peal of Judgment

SO painful were the ensuing months that I prefer not to dwell upon them. In all external ways we were treated kindly; we were instructed in the native language and customs; we were well housed and sheltered, and were given liberal quantities of synthetic food. Yet our position was that of cattle being fattened in their stalls. No! worse than that of cattle; nothing on four legs was even subjected to such torture! Muriel and I were separated forcibly; we were each compelled to pass hours daily in the company of our assigned mates, for whom our loathing constantly grew; we were forced to submit to blood-transfusions, so that they might be reanimated by our vitality; and we groaned to know that wedding ceremonies would be performed as soon as our partners had rejuvenated themselves sufficiently.

Meantime, naturally, our thoughts were constantly on escape—but how escape from the complicated labyrinths of Mu? We were allowed to wander through a long series of halls and corridors, all distressingly overheated, and all weirdly lighted by an indirect illumination; we explored caverns miles in extent and hundreds of feet in height, and inspected the vast museums and art galleries of ancient Mu, which depicted a life as strange and remote as that of ancient Egypt. But nowhere did there seem to be any haven from the watchful eyes of our captors.

Muriel and I, of course, were not the only sufferers. The entire crew of the

*Sea Dragon*, tamed by the lightnings of our masters, had been sentenced to share our doom. Forgetting my own predicament, I smiled to see Captain Hawker in the rôle of bridegroom-elect to a hairless ogress who, half blind and deaf, might have been mistaken for the ghost of his great-grandmother. And I experienced a momentary amusement to see the wry expressions with which each seaman, villainous-looking and hardened though he might be, received the news of his betrothal to some bent old crone with discolored features, wizened as a dried prune. If companionship in misfortune were an advantage, I was not wholly unblest!

It tore my heart when, on my rare meetings with my wife, I saw how she was fading away; how the bloom had left her cheeks and the sparkle had deserted her eyes; how she seemed years older, and walked with the air of one whose shoulders bear a heavy weight. Somehow, I kept telling myself, I must rescue her, I must!—though I totally failed to perceive how. The most I could do was to plead for her whenever possible with the Father Supreme. But all that I ever received in return was a hard, icy stare of refusal. Little could I foresee how, by antagonizing him, I was preparing the way for still more harrowing adventures.

In compensation for our suffering, we had not even the doubtful advantage of sharing in the life-giving Elixir of our hosts. Somewhat hesitantly—for the example of the natives had made us question the advantages of immortal life—we had asked to be allowed to inject some of the fluid into our own veins; but always our masters had shaken their heads and refused. "No, no, it has caused trouble enough already! Once you start taking it, you will never be able to stop!"

Plead as we would, we could not

alter their intention. The Children of Mu were like opium addicts, determined to shield others from the horrors of their drug!

\* \* \* \*

IT was after we had been several months in Mu that an event occurred which was to transform our future. The date of my marriage, and of Muriel's, also, had been fixed, and was scarcely forty-eight hours away . . . when the new catastrophe blurred all other thoughts from our horizon . . .

It all arose from a trivial incident—and the direct cause was Captain Hawker. Perhaps it was that the skipper had wearied of his superannuated fiancée; for one day, encountering Muriel unexpectedly in the reception hall, he showed himself suddenly susceptible to her charms; I might almost say, violently susceptible, for I am told that his arms reached out to enfold her—which might have been regarded as indignity enough, were it not for the graver sequel. At this point one of the Children of Mu saw fit to protest, for it was considered criminal to embrace another man's chosen bride. And, unfortunately, his protest took the form of claspng Captain Hawker's brawny arm, in an attempt to free the struggling Muriel.

Just what happened next was never quite plain to me; though, chancing to be in an adjoining room in the enforced company of Mara Joy, I heard the uproar and dashed to the scene. As nearly as I could gather, what had occurred was as follows: Captain Hawker, feeling the venerable son of Mu clinging to his arm, did the natural thing, and sought to fling his assailant off. But, alas! he was not dealing with an ordinary assailant. Frail, pitifully frail was the aged would-be pacifier; and when the Captain's powerful arm hurled him away, he was unable to check himself as he reeled and tottered backward . . .

A moment later, when I burst into the room, all was in confusion. The smitten man was lying on the floor, where he made no sound or motion; above him stood Captain Hawker, Muriel and five of the crew, all with shocked, bewildered expressions; while two or three natives of Mu, bending over the fallen one with gestures of impotent grief, were feeling his pulse and striving to warm his impassive limbs.

"Algo!" they were wailing, addressing their unresponsive fellow. "Algo, Algo, it is we! Speak to us! Speak!"

Over and over again they repeated that doleful plea. "Algo, it is we! Speak to us! Speak! Speak!"

But Algo gave no sign. And gradually their lamentations rose in pitch and volume. "Algo! Algo! Algo is dead! Algo dead, dead!" . . . And the final word took an accentuation indescribably eerie.

Now more of the Children of Mu came crowding into the room, first singly, then by the score, till hundreds had joined in that doleful chorus, "Algo! Algo! Algo is dead, dead, dead . . . Algo is dead, dead, dead! . . ."

Their grief seemed beyond anything that would normally be experienced—particularly among a people whose emotional powers were so nearly atrophied.

Not until the arrival of their leader did the explanation dawn upon me. With his wrinkled head bent forward almost at right angles to his body, the Father Supreme hobbled into view. From the first it was evident that he had heard the news; for he made his way directly to Algo, stooped down with a desolate expression, felt the prostrate form, and then joined in the general chorus. "Algo! Algo! Algo is dead! Algo dead, dead, dead!"

Staggering back to his feet, the Father Supreme fluttered his lean stick of an arm above him in a gesture of command. And instantly silence fell upon us.

The Father's breath came slow and hard, and it was between frequent pauses that he spoke:

"Dear comrades, this is a most melancholy day. Not for more than three thousand years has death been known among us. Not for more than three thousand years have any of us gone into the Long Silence. For he who partakes of the Cellular Elixir cannot die except by accident. And yet you know, dear comrades, the prophecy of our wise men when our last companion perished thirty-two centuries ago."

"Yes, yes, we know, we know!" mourned the multitude, resuming its wailing note. "We know. Algo is dead! Algo is dead! dead! dead!"

But a gesture of the Father Supreme brought back silence. "Do not be disheartened, my comrades. What though the priests of the Temple declared of old that, when the next of our members perishes, the rest will soon follow? After all, the ancient prediction need not come to pass. Other prophecies have been known to fail. Have we not the Cellular Elixir? Have we not the vitality of a shipload of strangers to prolong our existence?"

"But Algo is dead! Algo is dead! Algo is dead, dead!" came back the cry of the multitudes, with an insistence that made me shudder.

"GIVE heed to me!" the Father Supreme went on. "We need not fear for ourselves. But we must avenge Algo, according to the ancient law of our land. A life for a life! So let us determine who it was that killed him."

An ominous silence ensued, and all eyes peered about them inquiringly.

I noticed that several of the Children of Mu fixed their glances suspiciously upon Captain Hawker. But none of them uttered any word.

"A life for a life!" repeated the Father Supreme, with sinister emphasis. "We must determine who it was that killed Algo!"

The gazes of several of us were still fixed accusingly upon Captain Hawker. But he, with the alertness of a trapped creature, suddenly perceived his opportunity.

I saw his small eyes narrowing shrewdly; I saw the dread on his gorilla face giving way to a malicious grin; I saw his heavy frame swinging in my direction, and heard his gruff voice bawl its denunciation:

"There's your man! I saw him, the black-livered devil! We all saw him!"

Captain Hawker glared at me with a fury which betrayed how eager he was to make me his scapegoat.

Stunned at the accusation, I flung out a violent expletive. "I? It couldn't have been I! I wasn't even in the room!"

"Of course it couldn't have been!" exclaimed Muriel, rushing to my rescue. "I know he wasn't even in the room!"

"What's that? Not in the room?" bellowed Hawker. "Who's goin'a believe her? Why, it's clearer'n day! She's only tryin' to protect her man!"

The Father Supreme, to my consternation, nodded as if favoring this view. Could it be that, as the prospective mate of Muriel, he regarded me with a rival's jealousy?

At all events, he smiled approvingly upon my foe, while inquiring, "And what is your proof, good man?"

The "good man" gave a triumphant leer in my direction, and turning to the five seamen who had witnessed the tragedy, proclaimed, "They all saw him do it!" And then, in his old bullying tone, "Answer, you scum of the earth! Didn't you all see him do it?"

Long cowed by their skipper's domineering manner, the seamen were far

too supine to dare a denial. "Sure, we seen him do it!" they swore. "Seen him launch right out, and bowl the old guy over!"

Thus I stood condemned by six "eyewitnesses"!

It was useless for me to protest; useless to plead, despite all the fervor of my indignation. It was useless—worse than useless—for Muriel to appeal on my behalf; her every word lent strength to the opposition. All too soon it became apparent how prejudiced against me the Children of Mu had become, and how, in the manner of the rabble in all lands, they condemned without troubling to look into the facts. And all too soon I knew that Captain Hawker was not my most formidable foe. From the unwonted twinkle that came into the usually dull countenance of the Father Supreme, I recognized that some sly scheme was brewing beneath his venerable brow; and from the sharp intolerance with which he met all my pleas and denials, I realized that my suspicions as to his jealous nature were only too well founded. He seemed positively delighted at the opportunity to be lawfully rid of me!

UNFORTUNATELY, justice in Mu was administered without dalliance or delay. Unfortunately, also, there was but one judge in criminal matters—the Father Supreme—and from his verdict there was no appeal. Hence the prospects before me were not inviting.

Only an hour or two were consumed in questioning the alleged witnesses, who, dominated by their dread of the Captain, held to their original story, and thus sealed my doom. It seemed no time at all before the Father Supreme, with a hard, malicious look on his face, solemnly cleared his throat, and proclaimed his verdict:

"My dear friends, it is an unhappy duty that reposes upon me. Gladly,



in announcing my decision, would I temper justice with leniency. But the law permits no choice. The facts are too clear for dispute. Six reliable witnesses have testified against the defendant, whereas the law requires but two. Therefore I am but acting as the unwilling agent of the State, when I pronounce the defendant guilty of murder in the first category. And the penalty is death."

Grunts and murmurs of approval swept across the audience. Captain Hawker uttered an audible sigh of relief. The five seamen looked sheepish and slightly guilty. But from two female spectators there came sharp cries of anguish.

The first was Muriel, who flung herself upon my shoulders sobbing, filled with such despair, that, in the effort to console her, I all but forgot my own misfortune.

And the second—my pen hesitates to write it—was a haggard, dessicated daughter of Mu: none other than my own appointed mate, Mara Joy. Casting herself down upon the floor in a spasm of grief, she wailed and howled in such shrill distress, as to drown out even the lamentations of Muriel.

## CHAPTER VI

### Through the Black Gate

THE death sentence in Mu was expected to be executed by the victim himself within three days of conviction. There were several prescribed methods to choose from: he might take poison, or might kill himself with an electrical bolt, or might condemn himself to pass into the "lower regions"—in other words, might wander into the dark uninhabited galleries beneath the occupied districts, there to perish of starvation. Because of the harsh lingering doom which it entailed, the latter method

was regarded as far the cruellest of the three; yet it was this which, to every one's surprise, I selected, not because of any taste for torture, but because I vaguely felt that, if I could prolong my life, I might yet escape. . .

The day of the ordeal arrived, and I found myself standing with scores of the Children of Mu before a huge gate with a black skull-marking. On one side of me stood Muriel, her eyes red with weeping; on the opposite side stood the Father Supreme, his weazened face betraying a sly satisfaction; while to my rear hovered the crew of the *Sea Dragon*, grinning, not without a malign pleasure. The ceremonies were rapidly performed: after a brief speech by the Father Supreme, and a prayer by a mouldy-looking old priest with a canting air, the great gate clattered open, uncovering a black void.

At this sight, my knees quivered beneath me, and my last faint hope began to fail. . . Perhaps, after all, I had chosen the hardest way out!

"Owen! . . . Owen!" I heard a choked voice sobbing, as Muriel desperately flung herself toward me. For the last time, I felt the pressure of her hot, moist cheeks against my own; then it seemed as if violent hands pulled her away, for in the ensuing confusion she vanished. . . There was a muffled roaring as of many voices in my ears; it seemed as if some mechanical force was propelling me through space; the light faded out before me, I heard a rattling and a clanking followed by a disheartening thud. . . And silence, utter silence and blackness settled upon the universe.

Partially recovering myself, I began to stagger through the darkness. But a blind man would have been as well-off as I. The gloom was impermeable; stumbling and banging my head against hidden obstacles, I groped forward and downward, guided only by the sense of

touch. Vain effort! I could not accomplish twenty paces in as many minutes!

At last, in despair, I flung myself upon the cavern floor, striving as best I could to collect my thoughts. But was the torment already beginning to affect my mind? For it seemed to me that, from far along the gallery, I saw a light, a faint, star-like point of light, which wavered, went out, flashed into life again and then, distractedly fluttering, began moving slowly in my direction.

My heart beat a terrible thud-thud in my breast. Though never a superstitious man, I half believed that I was seeing ghosts!

And then, while I reeled and felt ready to collapse, something still stranger occurred. I heard my name—yes, unmistakably my name!—uttered from far-off, in the queerest of accents. "Owen! Owen!"

Was some uncanny power trying to taunt me? Or was it—could it be?—that this was she from whose arms I had just been wrested?

LIKE a madman, I rose to my feet. Tripping and stumbling, in defiance of all unseen obstacles, I started down that dark gallery toward what seemed to be light. "Muriel! Muriel!" I cried. And then, with increasing desperation, "Muriel! Muriel! Muriel!"

At length, by the wavering rays, I made out a shadowy figure, of about the size and height of my beloved. "Muriel! Muriel!" I exclaimed once more. "Muriel! Muriel, dear!" And, with a final dash forward, I reached out my arms to enclose her.

But how suddenly I stopped short, embracing mere air! With what a gasp of revulsion I stared at the object before me! This thin, shrivelled form was not that which I loved! Through the uncertain light, my gaze fell upon the crumpled features of Mara Joy!

Such was my disappointment that I could have seized the miserable creature and throttled her!

"Ah, Owen, Owen, it is you!" she exclaimed, tremulously, as I sank to the ground in despair. "I was so afraid of missing you!"

My only answer was a groan.

"See!" she continued, resting a frail hand unsteadily upon my shoulder. "See, I have brought a flashlight! I have smuggled in some concentrated food—enough to last for days! I squeezed myself in through the Black Gate at the last minute, when every one was too excited to notice."

"Squeezed yourself in?" I echoed, beginning to regain my senses, and realizing that this detested creature had perhaps done a generous deed. "Squeezed yourself in, Mara Joy? What for?"

Her tones came to me with cutting simplicity and directness. Amid the uncertain shadows I could almost imagine that it was a fair young girl instead of a withered hag that addressed me. "What for, Owen? Because I am your affianced bride. And there is an ancient law of Mu which says that wherever a man goes, there must his bride go with him."

"But surely, Mara, no one expected—"

"No one expected. No one knew. The ancient law is seldom remembered any more. But I have grown tired of living. Why should I not die with you? Besides, perhaps I can save you. There is not much chance, but—who knows? Shall I not try?"

"Try?" I vociferated, eager to snatch at any straw. "Of course, try! Get me out of here, Mara Joy, and I'll be grateful to you forever!"

She paused to regain her breath, and her feeble hand patted mine carressingly.

"It is only a forlorn hope," she resumed, her accents growing dull and flat. "But they say that one of these galleries—which I do not know—leads to the

upper world. With the help of my flashlight, we may find it."

"Of course, let's find it!" I encouraged. But my heart sank for what would it profit us to gain the frozen upper world?

However, we started off together along the winding gallery—a strangely assorted pair, the man of the twentieth century, and the woman already old when Homer was born! Her strength was slight—very slight—and we had to go but slowly, while I first supported her leaning form, and then carried her, finding the pinched frame no more of a burden than that of a child. Her flashlight showed us the way; the food she had brought refreshed us; we found water in an occasional spring; we rested at intervals, and down and down we went upon a curved unbranching gallery. And as we advanced the air grew hotter and hotter . . . until, finding the blazing temperature unendurable, I stripped to the waist, and, even so, felt ready to perish in the oven-like heat.

Perhaps as much as twenty-four hours had passed in this way, before I had all but lost hope. For we were still taking our way downward, and the temperature still was rising. "If we go on, we'll roast to death!" I insisted, making vain efforts to fan my perspiring brow. But Mara Joy, who seemed to thrive in the heat, urged me not to give up. "In a little while," she predicted, "the road will wind to the upper world."

And in a little while the road did wind, not to the upper world, but to a strange deliverance.

## CHAPTER VII

### A Chill from Outer Space

**T**HUS far all things about us had been black as death, and the fitful rays of the flashlight had provided our sole illumination. But now we began

to see a dim radiance ahead and, hastening on, came out into a world of strange and bewildering complexity.

Faintly lighted with an eerie reddish glow, a mighty hall opened out before us. Perhaps half a mile in width and double that length, it was filled from end to end with an intricacy of colossal machinery. How uncannily, how mysteriously the wheels and levers turned in that pale, twilight gloom! With what strange smoothness, with scarcely the creaking of an axle or bearing! How gigantically the black-encased engines loomed above us! How like great mountains, those turning masses of steel, revolving as if with slow, unchanging deliberation, or weaving back and forth, back and forth, with an unhurried motion that knew neither halt nor variation. Here, certainly, was mechanism brought to its ultimate perfection!—self-operating, self-perpetuating, self-complete!

In admiring awe, I stood gaping at the doorway, surveying that wilderness of machinery: those wheels high as a ten-story tower, those belts and chains longer than a city block, those enormous rods which, equipped with man-like hands and fingers, opened and closed with ordered regularity, performing a multitude of services in a way to remind me of Titanic robots. "What is this?" I gasped, still not comprehending. "What under heaven can it be?"

At my side there sounded the thin voice of Mara Joy:

"I know what it is! I know! I know! But none of us have seen it for centuries! It is the Sacred Machinery!"

"You mean, the machinery that runs your world? That provides you with heat and light? The machinery that controls your ventilating system?"

"Yes, that is it," affirmed Mara Joy. "The Sacred Machinery is run by means of the earth's internal energy. Pipes sunk miles deep bear water down to the heated

depths; and this water, rising in the form of steam, offers us an inexhaustible supply of power. The whole system works automatically, renewing its own worn-out parts for thousands of years."

I gave a gasp of astonishment; and then started forward eagerly, anxious to explore so marvelous a mechanism. But was I not treading on forbidden soil?

"Come back! Come back!" I heard Mara Joy screaming behind me in horror. "You mustn't go there! No man must ever go there!"

Paying no heed, I entered a little steel-paved aisle between two towering glass-encased instruments. And I paused before a tarnished brass dial, on which were a score of interesting-looking, little buttons, screws and knobs.

"Come back! Come back!" reiterated Mara Joy. "You mustn't go there! No man must ever go there! You don't know what you're doing, Owen! We'll all die if you go there!"

Leaving Mara to rave at a safe distance, in the manner of a hen whose ducklings have taken to water, I amused myself by turning and testing the knobs and levers. Just what their purpose might be I was not sure, but I had an idea that I might find out. I had no expectation, however, of the way in which I was to find out.

"Come back, come back!" my dismayed companion repeated once more. "Come back, quick! No stranger must ever, ever go there! There is an ancient prophecy—"

Unfortunately, I was not to learn about the prophecy. As Mara Joy uttered these words, I gave a twist to a harmless-looking little knob—and instantly there was a green flash of light and a detonation as of thunder. And, while I wheeled backward appalled, a strange grunbling, like a sigh of discontent, issued from the depths of the machinery, and all the wheels and belts

and chains and levers gradually slowed down and halted.

"Oh, now you have done it! I told you not to!" wailed Mara Joy, almost beside herself with grief. "You have stopped the Sacred Heating Machinery! Now we will all, all freeze to death!"

But surmising that I had merely switched off the electrical power-transmission, I gave a backward twist to the knob, and instantly there was another green flash, another detonation as of thunder, another groaning from the depths of the machinery, and all the wheels and belts and levers began to move once more.

"Ah," sighed Mara Joy, "now you have saved us!"

And she bowed down, as if offering thanks to the Unseen; for, luckily, she had been too excited to observe how I had performed the miracle.

As I noted the profound effect produced upon her, a sudden idea leapt into my head. All in one blinding flash, it came to me that I was saved! For had I not stumbled across the secret controlling the existence of the Children of Mu? Was it not a secret which they, thanks to centuries of sloth and indolence, had forgotten? With its help, might I not place them at my mercy?

As these questions rushed into my head, I gave another twist to the all-important knob, with the expected result: the outburst of lightning and thunder, and the stoppage of the machinery.

Then, striding over to Mara Joy, I commanded, "Come on, my lady, quick. We're going back again to your people!"

And, gathering the frail figure into my arms, I gave no heed to her protests, but began the return trip up the long sloping gallery.

\* \* \* \*

HOURS passed . . . Half exhausted but triumphant, we found ourselves just inside the Black Gate, which

I recognized from its skull-markings.

Already the effect of my exploit began to be noticeable! The gallery had become appreciably cooler!

Hence it was at first with high hope that I rapped at the Black Gate. Would not the drop in the thermometer have registered a change upon the Children of Mu?

But hours more were to pass before I was to have my answer. Though I rapped repeatedly; though I shouted at the top of my lungs, it was long before a lucky chance brought some one close enough to the gate to hear the commotion . . . Finally, however, voices were raised on the other side in excited discussion, and after an interval there came a reassuring, rattling sound, and the gate swung open.

As I had expected, a crowd of the natives were awaiting us. Upon seeing us emerge, they gibbered and cackled inanely, and started back as if in consternation. One or two pointed to us in a frightened manner; others showed horror or repugnance; while all were shivering as if from extreme cold.

"There! There he comes! There he comes!" they mumbled. "Back from the dead!"

"Back from the dead! Back from the dead! Back from the dead!" others took up the cry . . . "Soon, soon we will all be with the dead! We freeze! We freeze to death! We know not why, but we freeze to death!"

As if to emphasize this fact, the frames of several were racked with dreadful coughs; and other began desperately to beat their hands together and to rub the exposed parts of their faces. Yet the temperature was just what I considered comfortable.

"Yes, you freeze! You freeze to death!" I warned them, stepping forward menacingly. "You will all freeze unless you give heed to me!"

Even as I spoke, I noticed that several of my auditors were extracting little vials from the folds of their garments, and were tremblingly injecting a black fluid under the skin of their wrists with hypodermic needles. This was the Cellular Elixir, by means of which they sought to restore their frozen circulation.

"That will not help!" I cried to them, while they looked on in bewilderment. "But I can save you! Go call the Father Supreme! I can save you! Call the Father Supreme! Quick! Waste no time!"

One of my hearers tottered away to perform this mission, while the others moaned and muttered, "What has happened to us? Oh, what has happened? Why does it get so cold? Why does it get so cold? Have our gods deserted us? . . ."

These complaints were still being dinned upon the air, when, several minutes later, the Father Supreme hobbled into sight. But what had come over him? He looked—if that were possible—even older than before. His thin form was bent almost double; his mummified face had taken on an expression of anguish ghastly to see.

Upon drawing close to me, he lifted a little walking stick, and swung it at me in uncontrollable wrath. "You! You!" he sputtered, as if ready to strike me. "So it is you! What do you mean by coming back from the dead? No man ever came back before!"

"No man ever did the miracles which I have done!" I returned. "Are you feeling cold, good Father? Do you fear the frost? It is I that have caused it."

"You? You have caused it?" clamored the mob, pressing toward me in a wave of fury. "You—so you are the murderer?" And blue lightnings shot toward me, and might have brought my end had it not been for Mara Joy.



"He has caused it, but he will save you!" she announced, in her thin rasping voice. "Listen to him! He will save you!"

"**L**ISTEN to me! I will save you!" I repeated. And then, while the Children of Mu gathered closer in hostile silence, I proclaimed that I had solved the secret of the Sacred Machinery and could regulate it at will, but would restore its activity only on certain conditions.

"Quick! Restore it! Only restore it, and we'll give you anything!" replied an excited chorus, which the Father Supreme was powerless to control. "Quick! Quick! Make us warm! Only be quick!"

Pathetic beyond all words was the plight of the Children of Mu, as they shook and shivered in the deadly cold of a mild summer temperature. Pathetic beyond all words was the pleading, the agony, the terror on their weazened, monkey's masks of faces. Had I not, after all, gone too far?

But once more I thought of Muriel, and all my anger returned. "First give back my wife!" I stipulated.

Mara Joy uttered a little gasp of dismay. The Father Supreme stiffened indignantly, and his nostrils twitched. But the crowd screamed eagerly, "Give back his wife! Give her back! Give her back!"

And, overpowered by the force of popular sentiment, the Father Supreme had to bow his head and yield.

Hence it came about that, half an hour later, I was reunited to a tearful Muriel, who told me between sobs how she had given me up for lost, and how she had been ready to make away with herself, sooner than wed the Father Supreme, as she had been expected to do on the morrow.

By the time of Muriel's arrival, I had secured assent to a still more audacious demand. Henceforth I was to be the

leader of the Children of Mu! The Father Supreme was to relinquish his authority! He and his people were to obey me in all things, under pain of a return to the dread cold!

Having raged and threatened until the natives had granted a grudging assent to these conditions, I started back through the Black Gate, accompanied not only by Muriel, but by two of the Children of Mu, whom we held as hostages to insure fair play.

As we made our way by means of flashlights through the darkness, I heard the voice of Mara Joy, raised in shrill lamentation behind us; and my heart filled with pity for this poor creature with her hopeless devotion. And, at the same time, I heard her sisters and brothers chanting in dolorous chorus. "How cold it is, how cold, how cold! Make it warm again, O master! Make it warm, make it warm again! Make it warm, soon, soon, soon! . . ."

## CHAPTER VIII

### On a Tottering Throne

**A**S I look back upon my career as lord and sovereign of Mu, it seems to me, that I was no sooner established in office than fresh disasters broke forth.

Yet first there was the brief moment of my triumph, after I had set the Sacred Machinery back into motion and had become the acknowledged ruler. With what enthusiasm I seated myself on the throne of the Father Supreme, and beheld the humbled majesty of this desiccated patriarch! How gladly I exercised my authority to bring vengeance upon Captain Hawker and the seamen who had sworn falsely against me, dooming them to imprisonment behind the Black Gate, where they were held in submission by the lightnings of the Children of Mu! Sweet, sweet was my

victory—all the sweeter since it had restored me to the companionship of Muriel! But how short-lived it was to be!

It seems ironical to me now, that the full period of my reign was not more than six or seven days. Six or seven days! While the temperature rose again to its former level, and the Children of Mu, no longer shivering in the cold, were bowing down and giving thanks to me for saving their lives. So far as lay with their power, my subjects were offering me implicit obedience; yet already, after the first day or two, I began to wonder if it were worth while to govern these enfeebled, half-lifeless creatures. Rather, I thought, be a man among the living than a king among the mummies!

Hence it occurred to me to employ my new-won powers to learn the way back to the outer world. With this end in view, I put questions as to the magnetic substance which had entrapped the *Sea Dragon*, and was told that its effect was not irreversible; that, by setting up a counter-current, exerting a repulsion like that of negative electricity, it was possible to drive back objects instead of to draw them near. Encouraged by this news, I forced one of the reluctant Children of Mu to instruct me in the use of the counter-current, and even obtained a supply of the magnetic substance, which I secreted in readiness for possible use; and then, well pleased, I awaited developments. Unfortunately, I did not have to wait long.

It was on the seventh day that the disturbance arose. How unexpectedly, and with what cyclonic violence it smote us! Proceeding with Muriel to the amber-lighted chamber where I was wont to hold court, I was alarmed to hear loud wailings and lamentations. Along one side-gallery I observed—or thought I observed—two of the Children

of Mu bending over a prostrate figure and beating their breasts in despair. In another gallery I saw groups of natives emptying out the contents of little black vials, while uttering dolorous cries, and again I saw a prostrate figure. In the latter case I hastily inquired the cause, but was greeted with such an uproar of screeches and shouts that it seemed to me the part of discretion to withdraw.

Arriving at the throne-room, we found numbers of our subjects assembled, all babbling in such excitement that I wondered if the heavens were about to fall. Again, in their midst, I observed a prostrate form! And as the crowd tottered forth to meet us, one of their number reeled, sank, and staggered to the floor, where he lay motionless, while his comrades bent over him with sobs and moans of grief and terror.

“MY friends,” I began, trying to seem composed, “what has—”

A roar of rage cut me short. The people pressed toward me as if with murderous intentions. A blue bolt shot over our heads, and there was a detonation as of thunder.

“Now! Now you have done it!” I could make out amid the howls and mutterings of the crowd. “Now, now you have done it! Destroyer! Destroyer!”

“Destroyer? Of what?” I gasped, while I pressed back toward the door and Muriel clung close for protection.

“Destroyer of everything!” came the shrill reply. And, from amid the rabble, the stooping form of the Father Supreme emerged, shaking like a leaf in the fury of his antagonism.

“You—you are the destroyer of everything!” he reiterated, while from the rumpled recesses of his garment he drew a familiar-looking black vial with shaking fingers. “See this! The Cellular

Elixir! The fluid our lives depend upon! Without it we would all die!"

Noting how he quivered and panted in his agitation, I remained silent and waited.

"But now, now what has happened?" he rasped. "What has happened, what has happened, thanks to you?" You turned off the Sacred Machinery! You let in the cold! You killed the cells of the Life-Elixir, which require a constant heat! Now it is all dead! Dead and worthless! We can use it no more! We will all, all, die!"

So speaking, he raised the vial above his head and flung it wrathfully to the floor, where it lay shattered in a thousand fragments, the spilled contents making an ugly ink-like stain on the milky stone.

At the same time, the mob let forth a howl horrible to hear. "We will all, all, die!" they took up the wailing, while, with distorted angry faces, they pressed closer. And another blue bolt shot forth, so near me that it singed my hair.

"It is he, he that is to blame!" charged the Father Supreme, pointing a bony finger at me accusingly. And the mob, still staring in consternation at that black stain on the floor, yelled its enmity, and another blue bolt flashed forth, passing so close to Muriel's head that the poor girl screamed in terror.

Huddled against the wall, I stood like a beast at bay, one arm about Muriel, the other lifted in the vain effort to restore order. "Strike him down! Strike him down! Kill him!" was dinned and screamed into my ears. "Kill him! Kill him! Kill him!"

And new bolts leapt and flickered all about us.

Except for a sudden inspiration, that moment might have seen the last of us. But could I not still play upon the people's superstitious awe of my powers?

"Give heed to me!" I cried, stepping forward with renewed courage, and flinging up my arm once more in a commanding gesture. "Give heed, and you may be saved!"

"Give no heed!" yelled the Father Supreme. "He means not what he says!"

"Give heed, or you will all go down to the Long Silence!"

Some tatters of my shattered authority seemed to remain, for the mob grew more quiet, and no more blue bolts screamed about us as, reluctantly impressed, they stood listening.

"Did I not save you once?" I shouted. "Did I not bring back the heat when it failed? Then give me time, and I will save you again! Give me time, and I will restore the Cellular Elixir! You will all be saved! Only give me time!"

"Give him no time!" screamed the Father Supreme. "He means not what he says! Each hour others of us fall to rise no more!"

"Each hour I will save others from the Long Silence!"

Doubtfully the Children of Mu stood glancing at me. And I, profiting from their hesitation, edged toward the door and whispered into Muriel's ears, "Come! Quick! We've barely time!"

A moment later, in the gallery outside, we were retreating as fast as our flying feet and panting breath permitted.

Our last glimpse had shown us the Children of Mu still staring in dismay at that inky patch on the white floor.

\* \* \* \*

"UP! To the upper corridors!" I shrilled, as we made our way through the winding labyrinth, careful to avoid the more peopled thoroughfares.

"But what—what of the others?" Muriel panted, as she raced at my side. "What of the sailormen?"

"We'll save them too!" I gasped; and, turning slightly to one side, dashed

toward the seamen's quarters. Fortunately, I found most of the men in, and had no difficulty to communicate the alarm I felt; hence, a few minutes later, fifteen of the crew had joined our flight.

Up and up and up we wound and stumbled; but, until we had reached the great cavern where the *Sea Dragon* was moored, we saw no sign of the natives. For one exultant moment we almost imagined that we had made good our escape. But no! we were not so fortunate! As we panted among the great stone columns toward the alabaster dock, we heard a shout from behind, and instantly a blue light flamed about us, and thunder dinned and clattered in our ears. And one of the seamen, without even a moan, wavered in his tracks and fell—a seared and shrivelled thing, his skin burnt black. . . .

Glancing back in horror, we saw a dozen, foes darting toward us, their trembling hands clutching little pistol-like implements. Filled with a preternatural activity, they rushed forward among the stone columns with an almost youthful vigor.

Even as we caught our first terrified glimpse of them, another wave of blue fire shot past us, and another seaman fell, his cloak seared to cinders, while the odor of scorched flesh filled the air.

Only a hundred yards now separated us from the vessel. But, spent and breathless as we were, this appeared an impassable abyss. Minutes seemed to drag by as we forced ourselves desperately forward, sagging and almost ready to fall . . . And now the blue lightnings flared and sparkled in a dazzling display. One bolt, with a bewildering crash, struck a stone column, causing an ominous-looking crack to appear; another bolt felled two seamen and stunned a third; a third crackled just above the *Sea Dragon*, which, only by a miracle,

was saved from bursting into flames. . . .

Then, just as we reached the vessel, the most powerful bolt of all boomed against the cavern walls. And while its echoes still dinned in our ears, we saw that one of the great stone columns was twisted awry, at an angle like that of the leaning tower of Pisa. . . .

But, almost immediately afterwards, a weird, unbelievable silence ensued. As we crouched on the schooner's deck, not another blue bolt burst through the air, not another reverberation of thunder jarred upon our ears. Was this unexpected lull but a ruse of our pursuers?

Apparently not; for, glancing back, we saw a grievous sight.

All our foes, overcome by their unwonted efforts, had collapsed. Several were lying prone; the others were writhing as if in their death-throes. Their frail energies had been unequal to the tax upon them!

NOT pausing to exult at our escape—for might not other pursuers be at hand?—Muriel and I, with the aid of the surviving seamen, set about to start the vessel on its way. Fortunate indeed it was that I possessed the secret of the reverse magnetic attraction! With its aid, after a few minutes, the *Sea Dragon* slowly began to leave the dock, gliding at gradually increasing speed toward the coaly-black outer channel. . . .

For the last time, we glanced back at the fantastic world of Mu, with its gigantic stone towers, its opalescent waters, its chalky-white towering walls so palely illuminated—and then we drifted into the shadows of the long, underground passageway.

Barely had we floated into its protection; barely had we passed more than a stone's throw from the silvery white oval of the entrance, when we were shaken by a great convulsion. The waters suddenly leapt and heaved until our

vessel was all but submerged; there was a deafening roar in our ears, as though a mountain were toppling all about us; the oval light of the gateway was blotted out; and we pitched and tossed in the blackness, a terrified crew in a universe dark as Tartarus.

Only gradually, as we felt the waters grow less agitated, did the dread realization dawn upon us. The huge stone supports of the inner cavern, cracked and battered by the bolts of the maddened natives, had collapsed, bringing down the roof and ruining beyond repair the whole world of Mu!

Amid such a catastrophe, it was only too plain, there could be no survivors. Already the Father Supreme, Mara Joy, and the last of their comrades, were sleeping in the Long Silence!

As this recognition came to us. I chanced to remember Captain Hawker and the five members of the crew, whom, a few days before, I had caused to be locked behind the Black Gate. And I

heaved a sigh, for, though they had had me sentenced unjustly to death, I had not wished to bring them to their doom. Might they slumber in peace!

\* \* \* \*

There is little more to be told. Three months later, after a voyage fraught with hardship, the *Sea Dragon* put into the port of Melbourne; and Muriel and I, bidding farewell to the crew and changing ships for San Francisco, felt that we had had adventures enough to last us for many a day.

Our chief regret was that we had been unable to bring back a vial of the Cellular Elixir. However, when I recall the Children of Mu, with their repulsive features and pointless existence, I am glad that the secret of the Elixir has been lost: for it might have proved the ruination of our world, which in time would have come to be inhabited by dotards, as inane and hideous as the last survivors of the vanished continent of the Pacific.

#### THE END

### Science Questionnaire

1. What ancient fabulous legend tells of man flying? (See page 7.)
2. Who may be considered the first serious investigator of human flying? (See page 8.)
3. What was the limitation of the work of Chanute and Lillienthal? (See page 9.)
4. What is the great requirement of the air tunnel used in experiments on flying? (See page 10.)
5. What is the speed of light? (See page 45.)
6. What is the melting point of tungsten? (See page 47.)
7. To what geologic ages may the pterodactyl be assigned? (See page 59.)
8. What possible source of power is probably in the earth? (See page 77.)
9. What is the constitution of a neutron? (See page 95.)
10. How is the creosote bush in Death Valley, said to maintain its existence? (See page 98.)
11. What is ozone and how may it be formed? (See page 99.)
12. How have microscopic diamonds been made artificially? (See page 100.)
13. What is time? (See page 100.)
14. How does the sun compare in diameter with the stars Betelgeuse, Orion or Antares in Scorpio? (See page 102.)
15. How many earths could be packed into the volume of the sun? (See page 102.)
16. What is the diameter of the smallest particle man can see by microscope? (See page 103.)
17. What is photosynthesis? (See page 109.)
18. At a speed of 180,000 miles per second how long would it take to reach the nearest star system? (See page 118.)
19. What would be the result if a planet's polar axis was perpendicular to the plane of its orbit as it moved around its sun? (See page 125.)
20. What is the fastest known flier, and what is its supposed speed? (See page 134.)



# A Saga of Posi and Nega

By JOSEPH WM. SKIDMORE

*The author gives us so interesting a prologue to this installment of his "Saga of the Atom" that we feel that there is nothing left for us to say. We have felt that a very happy theme was found in this subject of the constitution of matter and giving it the touch of personality makes it very charming.*

## Prologue

**A** GAIN with mighty conceit and vast temerity, I attempt to describe the atomic emotions and adventures of Posi and Nega.

I marvel at the composition of each atom, with its protons (of the nucleus) as a central sun radiating, vibrating, pulsating out of light, heat, and energy! I amaze at the incredible motion of matter, which is beyond the power of man's total annihilation!

We are prone to define our stupidity as fate, and our good fortune as our cleverness.

I have the good fortune to publish the Posi and Nega tales, and I possess the stupidity to attempt such an abstruse subject; but I have just enough cleverness to admit my astounding lack of technical skill and knowledge. As to my writing fate—we shall see!

So please bear with this impotent and unlearned pen.

"Knowledge is a feeling that we know a lot

Wisdom is gratitude for what little we know." (Schopenhauer.)

—J. W. S.

**T** HE atom of carbon, in which lived and orbited Posi and Nega, flew into space, as the signal pistol was fired by the dying tellurian.

"Media of Mer!" ripped out Posi, the tiny, positive electron. "We're off for a fine flight now; we're going to have some new and exciting adventures!"

Nega, the smaller and negative electron and Posi's ardent companion in many an incredible episode, increased the hissing speed of her orbit, and sized:

"Oh, Posi! It's such fun to be with you! I'm not afraid of anything as long as I'm in this carbon atom with you! You're so wise; so brave; so handsome!"

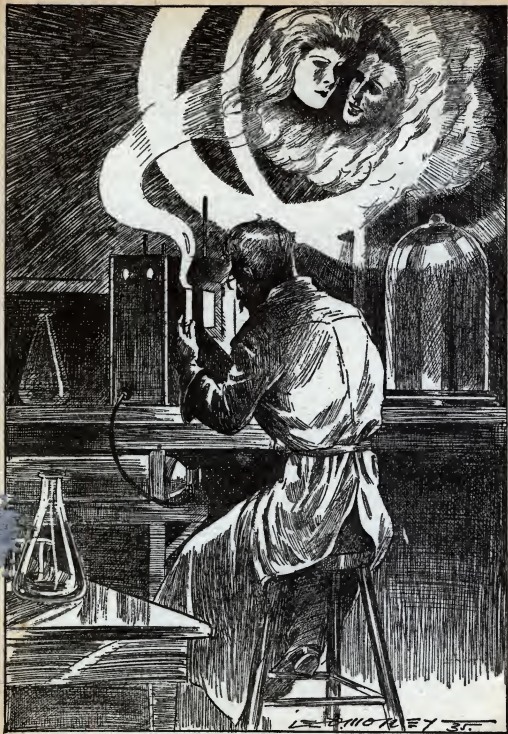
Posi's infinitely small mass—although 1,840 times greater than Nega's—swelled in his vast conceit. The precocious little proton was elated by Nega's words. He smugly glowed in his softest vibrations.

"You're a swell little dame, Nega! You're smart, too—for a woman! I—er—I—maybe—some day—I'll marry you!"

"Oh, Posi!" shrilled Nega. "What will happen to us when we are married?"

Posi glowed erubescence with his abashment; finally, he crackled:

"Why, you stupid, female electron, we would become a neutron! This often happens in the best of atomic society. A positive electron, like myself, and a negative electron, like your own sweet self,



*There was a leak in the nutty scientist's device and a huge mass of carbon dioxide gas escaped! Our carbon atom leaked safely through and now we're drifting around in the atmosphere!*

come into actual contact. The lucky two form such a close union that some of the mass is lost; and the atomic weight of the combined two become less than that of the two before the union! Then the two electrons are married, and the new mass is called a neutron!"

"Go on!" purred Nega, excitedly, "tell me more!"

"I won't!" snarled Posi. "Cosmos! I've talked too much already—gotten myself engaged! Hold your orbit and control your vibrations until I find out where we are!"

Nega began to converse with her five companion negative electrons in their carbon atom.

\* \* \* \* \*

POSI and Nega, the two tiny electrons, had experienced many incredible adventures together in various elements. They were born far out in the "cold places" of endless space—mothered by the mysterious cosmic rays; and fathered by that incomprehensible energy which gives life and motion to electrons.

Posi was created a positive electron, sometimes called by tellurians a "proton." Nega came to life a negative or orbital electron. They were first met in an atom of helium gas. For countless eons they lived and loved, drifting hither and yon in the vast voids of space—a carefree existence—whirling and dancing strange dances of love; singing, vibrating, hissing melodies with the amazing speeds of their flashing orbits.

Strange! but Posi was 1,840 times greater than the radiant, vivacious Nega. The mighty and inscrutable Intelligence, which directs all life and motion, has vested negative electrons with an astounding power. In the composition of the known elements, it usually requires

but one tiny negative electron to balance of the larger, more massive positive electrons!

Posi, the positive electron, was male; Nega, negative, or female. Such it is in human life!

Then, in the mighty vastness of space, they drifted into the powerful pull of the sun's gravity. For years they sped, with ever increasing velocity, toward the blazing, exploding furnace of the sun. Had they been drawn into Phaeton's fiery blaze, they would have been exploded; the positive charge of their atom would have helped with its infinitesimal bit to form a sun wave, or pulse of energy—to warm and light the planets.

A giant space car picked them up, barely in time, scooping millions of the helium atoms into one of its forward impelling tubes. The space car, carrying hundreds of Vega travellers en route to earth, collided with an immense meteor. In the frightful heat developed from the impact, Posi and Nega were transmuted by the terrific temperature and pressure into an iron atom!

The meteor and the space car, a fused, shapeless piece of metal, being within the attraction of earth, plunged to Arizona soil. For years Posi and Nega led a very dull existence in their iron atom, 1400 feet under the ground.

A party of earth scientists dug a shaft to the meteor and took samples for experiments. Posi and Nega were among the countless billions of electrons that made up the mass of the tiny fragment of meteor taken by the scientists for laboratory tests. Horrible experiences followed for the two little beings.

The scientists placed their iron atom along with billions of others into a deadly "Alpha Ray" machine; their tiny fragment of iron was bombarded with rending, streaking rays. The scientists

were attempting to disintegrate atoms!

The result was a mighty debacle of atoms, nuclei and electrons gone mad! Incredibly small solar systems flying berserkly from their orbits! Miniature worlds and universes were smashed—disintegrated!

By some miracle, Posi and Nega escaped destruction, not being struck squarely by any of the darting, swording "Alpha Rays." They were, however, driven into the lead lining of the device, to become, by some incredible transmutation, part of a *lead* atom.

**Y**EARS passed; the "Alpha Ray" device, worn out, was sold for junk, to the supreme disgust of the excitable Posi.

The lead was finally sold to an ammunition factory and melted into bullets. Posi and Nega, in their lead atom that helped to make up the mass of a bullet, experienced a very exciting adventure. A human used their bullet to murder another unlucky human! Posi and Nega were instrumental in bringing the murderer to his human punishment!

After a mighty explosion in the laboratory of the crazed doctor, who committed the murder, Posi and Nega found themselves literally blown into an atom of *oxygen*. In their new atom of oxygen they drifted around in the atmosphere; and, to the added indignation of Posi, were breathed into the lungs of a human infected with typhoid fever! They were introduced into the patient's blood stream, and were thus carried to the human's alimentary system. There they were attacked and eaten by a dreadful *Typhosus Bacillus*! Posi's rage knew no bounds when they suffered the indignity of passing through the diseased human's digestive system and then into a sewer!

From the sewer they were washed into the Pacific Ocean. For years their

atom of oxygen drifted hither and yon, borne by whimsical currents. True, they had some exciting adventures but the impatient Posi was discontented with his marine life. One lucky day, they drifted close to the ocean's surface; and their oxygen atom was drawn into the sky with a mighty mass of water vapor!

The process of being evaporated by the sun proved to be a very exciting adventure. A swift airplane picked up Posi and Nega; and the drop of water, of which our tiny travelers were infinitesimal parts, slipped into the closed cockpit of the plane. Their drop of water evaporated.

"Enif of Pegasi!" vibrated Posi to the delightful Nega. "Our oxygen atom has separated itself from the two hydrogen atoms, which made up our molecule of water! We're free oxygen gas again! And the human piloting this plane has breathed us into his lungs! Now we're in his blood stream! There! we've lodged securely in his eye—in his Crystalline Lens!"

Posi's and Nega's life in the tellurian's body proved a series of amazing incidents.

The tellurian was a mad scientist, who was about to destroy the entire universe with atomic disintegration—a scientific, cosmic short-circuit!

But Posi and Nega, aided by countless trillions of other electrons, killed the insane scientist to save all the worlds!

The vast host of electrons accomplished the demise of the obsessed scientist by simply changing the selenium atoms in the human's body to arsenic atoms!

The dead tellurian was cremated; and Posi and Nega were transmuted by the furnace heat into a carbon atom. For some time, they drifted in the air as soot—in a smoke cloud.

Gravity drew their new carbon atom

and its molecule to earth; it settled in a human signal pistol. The signal pistol was in the crow's nest (look out station) of a mighty, tellurian, dirigible air-ship. The dirigible made a trip out over the ocean and encountered a terrific storm. The great dirigible was wrecked; the gas bag, torn from its heavy motors and under-carriage, rose to a vast height.

One of the doomed, freezing humans in the crow's nest fired the signal pistol in a vain effort to secure help.

Posi and Nega, in their carbon atom, were in the pistol barrel, and they were flung into the air!

Thus we closed the last episode of our tiny adventurers, with the irrepressible and egotistical Posi waxing tender and amorous toward the delectable Nega!

\* \* \* \* \*

"**P**OSI, my dear," vibrated Nega, the negative electron, using her most seductive impulses, "please tell me where we are."

"Shaula of Scorpio!" crackled Posi, the positive electron. "I've just established a fine line of communication with Potor. Potor is an old carbon proton in a neighboring atom. He knows a lot of electrons I have met; he once lived in a zirconium atom on Venus—that's the planet of love. Potor knew some nice girls I met there—on Venus. Let me think! Yes; there was Gatel—and Netel! They were swell dames; trim, round, negative electrons! Oh, what was I vibrating? Now Nega, I was just joking—only teasing you!"

Posi paused; he seemed to shrink in mass from the embarrassment caused by his amorous retrospection.

Nega suddenly glowed a bright, luminous red; her blazing anger increased her orbital speed, as she ripped out:

"You wretch! You senile, old roué! You're always boasting of your ancient love affairs! You couldn't be true to

one electron for a million years! You—"

"My darling Nega!" Posi instantly broadcasted his keenest sophism. "I was only fooling about Gatel and Netel—just to see how much you loved me! Arneb of Lepus! You're beautiful when you're angry. Your angry red fits you like the rings of Saturn! And don't call me old! I'm only twenty million years of age—as these foolish tellurians calculate time!"

Nega, gullible, as women ever are, was quickly mollified; her vibrations were softer, as she lighted up and flashed out:

"I've noticed your atmospheric rings are turning a silver gray in the last ten thousand years! But, I'm not angry now. Tell me where we are."

"Of course, my sweet, but dumb one," sibilated Posi, anxious to make up; and always eager to gratify his vanity in displaying his technical knowledge. "You know, of course, that we were just fired from the signal pistol. Our carbon atom is now drifting around in the troposphere."

"Good old Potor has told me lots of interesting news."

Nega impulsed: "What is the troposphere?"

"No wonder your dumb sex is called negative," sputtered Posi; then he continued, proud to expand his academical knowledge for the admiring Nega: "The troposphere is all that portion of the earth's atmosphere below the tropopause and stratosphere; it is that portion in which temperature rapidly decreases with altitude, and in which convection is active. The stratosphere is the isothermal region above the troposphere. In the stratosphere temperature changes but little, and there is practically no convection. Do you understand?"

"Yes," lied Nega in a low buzz; "but what will happen to us?"



"I DON'T know," puzzled Posi; "it will be just our cursed luck to fall back into the ocean. If we do, our carbon atom will sink to the bottom of the ocean; and Cosmos only knows when we would reach the surface again. First, it was the awful sewer; then, the dull ocean; then, in the corpse of the mad scientist; and, now, here we are, about to fall into the ocean again! Nega, we're having bad luck!"

"I think it's been wonderful," gleamed Nega, glowing her most charming purple; "it's simply great to be in the same atom with you!"

"Watch your orbit!" hissed Posi. "Here's some exciting news. We've drifted into a fearful lightning storm! The atmospheric electricity is discharging from a vast mass of clouds and is flashing to earth! Cosmos! We're in great danger! If a streaking bolt of that mighty energy strikes our atom, we may be destroyed! Those powerful rays would flash from positive to negative—you and me—and our charges would cancel!"

Nega oscillated in her orbit and squealed: "Oh, Posi, what would that do to us?"

The excited Posi fairly simmered his reply:

"We might actually meet and coalesce! We would instantly become a splash of energy in the ether, and spread out in electro-magnetic waves carrying us off as energy. We could become, Cosmos knows what! Perhaps a boiling, seething, incredibly hot, heavy gas, such as some of the younger stars are made of! Potor tells me that several electrons have already been destroyed in his molecule, and that his atom is fairly crackling with vast energy! Lightning is electricity gone mad! It looks bad for us!"

Woman, finer and more sensitive than man, is usually the more courageous in moments of supreme danger. Nega,

with true Spartan courage, flashed bravely:

"I'm not afraid; we've shared deadly perils before this!"

"Electra of Tauri!" seethed Posi. "A bolt of lightning has struck our molecule! Nega, my sweet, hold your energy current neutral! I'll change your usual centrifugal force for you to that of my strongest attraction! Cosmos! Here comes the lightning ray! Now it's in our atom!"

All forms of life, from the single-celled amoeba to man, have a dominating, passionate desire to live; and all possess an inherent dread of death. The most sluggish sea-worm will struggle desperately to survive. The lowly creosote-bush, growing in Death Valley desert, sends its roots fifty feet deep for precious water; and varnishes its few miserable leaves as a protection against excessive evaporation from the fearful heat!

Again, this impotent pen pauses uncertainly; estopped in reverent wonder; amazed at the vastness of things—and the smallness; pondering meekly on the astounding, numerical certainty of atoms—and the intricate, but timed movements of the stars; solemnly conscious of the Mighty Intelligence directing all motion and matter.

If this futile pen possessed inspired skill and strength to describe a crashing debacle of worlds—of universes, then it could picture the atomic disasters which seethed around Posi and Nega.

Can man—who smugly fancies, in his vast conceit, that the stars were placed in the heavens in order that he be dimly lighted at night—set up that electrons do not possess life and consciousness?

Came a mighty blasting! A holocaust of searing, streaking flashes of ripping energy, sworded with millions of rending volts!

Atoms smashed—disintegrated! Nuclei blasted apart! Miniature solar sys-

ems disrupted by collisions of vast energy!

"Hold me tight, Posi!" shrieked Nega, as she tried to swing her orbit toward Posi.

Posi and Nega experienced a sudden, rending shock, as their round masses were flung from their orbits, and violently hurled through space! Their atom was being torn asunder! Two gallant positive electrons in the carbon atom were struck squarely by the powerful energy rays, and were blasted to tiny fragments. These fragments from the protons instantly began to revolve in new orbits. They became positrons!

Every atom normally contains an equalized number of protons and electrons—hence the complete atom is always neutral. When an atom loses one, or more, of its outer negative charges (or electrons) it becomes a charged atom, or ion. Thus many atoms, near to Posi and Nega (a few million molecules distant) became ions as lightning rays tore into their outer electrons!

A smashed group of coalesced electrons crashed out of their orbital positions, and darted along with the streaking, deadly rays of electric lightning!

In near by atoms, millions of positive electrons were destroyed. The negative electrons, such as Nega, being 1,840 times lighter than the positive electrons, were harder to hit and did not suffer so many casualties; but many perished.

The atmosphere was super-charged with ozone by the chemistry of nature. The electric sparks, of high voltage, passing through nearby oxygen atoms, formed the oxygen atoms into molecules of three atoms instead of two. Thus ozone is created; and the reason why it is ever present with severe lightning storms.

"DUHR of Leo!" urged Posi. "Nega, my darling, this may be death for

us! Our atom is being wrecked! By the beard of the Comet! We're now flashing to earth with a bolt of lightning! Hold fast, we're going to strike; and we're traveling fast as light!"

An unthinkable fulmination and Posi and Nega felt a sudden, fearful shock! Posi, even in his supreme agony, pulled, with all his power, to hold Nega in his orbit!

The lightning bolt, carrying with it a great mass of carbon atoms, had blasted its way with an indescribable detonation into a glacier-covered granite mountain.

Posi and Nega, fighting madly to regain their orbits, felt other electrons crowded against them. The contact was strangely repulsive. Protons and electrons darted into new orbits. All was mad, spinning confusion! Posi screamed in torment and rage, as a strange proton came dangerously close. He scorched out:

"Get away, you fool! I'm Posi. I——"

Then, Posi felt Nega's trim, round mass crush in near to him with the relentless pressure. Her tiny sphere and presence was gratifying to him. Nega was nearly unconscious; but, instinctively, she was desperately struggling and whirling to regain her true atomic position.

Now, a Hades-like, vast, searing heat blasted into the disrupted carbon atom! Heats and unendurable pressures from the force of the lightning bolt striking the great mountain!

The alchemy of Nature wrought a miracle! Strange, but immutable are the laws of Nature's chemistry! Gower, the early English poet, wrote:

"What Nature hath set in hir lawe  
"That mai no mannes miht with-  
drawe."

A freezing, bitter cold came for Posi and Nega; the cold of the vast icy glacier of the mountain.

Instantly, the millions of carbon atoms

darted into new and strange chains of crystals in the isometric system! Carbon atoms have the faculty of foaming into various forms of crystal chains.

Posi and Nega fell easily into their regular orbits and positions. Of a sudden, they were in their own carbon atom!

What mighty, eternal, natural law exists to so quickly and miraculously bring order out of chaos?

"Oh, Posi!" whimpered Nega, "that was a terrible experience! Are we safe now?"

"Wait!" gleamed Posi. "I'm getting wonderful news from Potor. He came through the ordeal safely. Watch your orbit and wait a second."

Posi gleamed a violent purple; and Nega knew he was receiving important news.

Suddenly, Posi twanged out in his sharpest vibrations:

"Wega of Vega! Nega, we're part of a diamond! What a glorious stroke of luck for us. The chemistry of the heat and pressure, and then the cold have made our mass of carbon atoms into a diamond! A diamond! Think of that, my exquisite Nega! We're in our carbon atom; and we're in the center of a large and valuable diamond! Now we'll have real adventures—that is, if any human finds us."

"I'm so happy!" bubbled Nega; "but tell me how we became part of a diamond!"

"Of all the dumb females!" swished Posi. "Even those stupid tellurian scientists know how to make a diamond in their puny laboratories. They dissolve carbon in molten iron and by cooling the mass rapidly under an enormous pressure, they have actually made microscopic diamonds. Don't you see what happened to us—our mass of carbon atoms; the lightning dashing us to earth; the resultant heat and pressure, and then the sudden cooling? And behold, we are now a diamond!"

"No; I don't understand," Nega sighed. "Once, a thousand years ago, you told me that male tellurians gave the females diamonds when they were going to be married. Please, Posi, tell me more of love and marriage—our marriage!"

The cunning artifice of a woman in love.

But the Rogue Posi was not to be easily led into a connubial snare; he was wary of jugal traps. He rotated more swiftly as he considered mightily for a device to change the murderous topic. A shrewd invention flashed to him; he hummed:

"Not now, my darling; Potor is signalling to me. He and I are establishing a line of communication with trillions of other electrons. I'll soon have some news for you! You look tired, my sweet, after our dreadful ordeal. Take a six months' nap; I'll watch your orbit!"

"Women are soft, mild, pitiful, and flexible." (Shakespeare.)

\* \* \* \* \*

**T**IME—mysterious, undefinable time—moved along in its relentless march, taking its inevitable toll of man, planets, and life.

What is time? Tellurians define it: The measurable aspect of duration. Some profoundly claim time is the fourth dimension.

—Heraclitus of Ephesus, the "Weeping Philosopher," who lived 500 B. C., was oppressed with the sense of the perpetual change in nature. He wrote that nothing was at rest; that all was continual movement and progression; that time was a mighty stream flowing on forever, in which thoughts and action appear for a moment and then vanish.

"Time is the foe of man's dominion." (Peacock:)

Therefore, not knowing what time is, this debile pen will record that the diamond—in which lived and vibrated Posi and Nega—lay for many seasons in the

great glacier, slowly moving downwards.

"Wezen of Canis!" twanged out Posi, after a long, sullen silence. "I'm getting tired of this dull existence! Here we are—a fine, important diamond—imprisoned under a huge mass of ice! Why, we may be here for thousands of years, before we are found by some stupid tellurian, and have any adventures! Besides, I don't like this cold climate; I like heat, to speed up our rotations! Why, Nega, you're hardly moving—only about nine million miles a minute!"

Nega glowed amused yellow as she whirled:

"Posi, you're always making fun of the tellurians. What do we care whether the humans find us or not?"

"Tellurians are so foolish that they're amusing," rasped Posi; "they organize into groups and actually murder each other scientifically by the millions! They call it war! And they think they are the highest form of life and intelligence! What we electrons could tell them! If we could but communicate with them. Then what marvels of chemistry and science they could work! These humans are very funny; but they're interesting. Of course, they're not old in life and experience like us electrons. Why, only a few million years ago, humans were but sluggish protoplasms, drifting about in thermal swamps. With evolution, some protoplasms became things that swam; some that crawled; and finally, some mutated into ape-like, savage creatures, battling with huge antediluvian monsters. Man—in spite of his new-born and faintly glimmering intellect—would never have survived those fearful ages of giant reptiles, had it not been for his wonderful, fingered, prehensile hands. If these tellurians could only know of the high form of life which exists on other planets! How on Venus, the self-motivated beings are——"

"You promised," pulsed Nega in inter-

ruption, "to tell me about tellurians—and how they make love!"

"**A**TLAS of Taurus," erged Posi. "Can't you get your silly, feminine mind off the love idea? Didn't I say I'd marry you—when you reach maturity? You're just a dumb cluck of a child yet! You're only two million years old! And, besides, I'm conversing with Potor right now. He says we're having a warm summer for this part of earth; and there is a chance that our mass of glacier will melt. If that happens we will be washed down the mountains by the water. In the lower valleys we will have a better chance to be found, and to have adventures. The trouble is that these foolish humans might not know we are a diamond!"

"Don't the humans know a diamond when they see it?" Nega twinkled.

"Yes," clicked Posi in reply; "some of them know; but our diamond is just a rough, dirty, unglowing pebble. It has to be faceted and polished by skilled, human lapidaries, before it will refract light to the best advantage. Even if some tellurian finds us, he might think we're just an ordinary pebble!"

Nega swung her pretty orbit and glowed:

"Tell me more about diamonds—and you haven't told me why the male human gives a diamond to the female human—when they're in love?"

"Diamond," zipped Posi, quickly to change the dangerous topic, and always proud to give out information, "is the most interesting and remarkable of all minerals. It is pure carbon; but, conversely, pure carbon is not necessarily diamond. To form diamond, the carbon atoms must form in crystals of a particular shape. Graphite is also a crystallized form of carbon; but in the case of graphite, the crystals form in different atomic chains from that of diamond.

Here's something very strange, Nega, my sweet, dumb one: The hardest and whitest mineral in the universe is diamond, and the blackest and softest mineral is graphite—and both are pure carbon! Diamond is also the most abrasive, while graphite is a perfect lubricant!"

Posi paused to check his orbit and whirled on:

"Diamond crystals, formed by our atom and billions like it, arrange themselves in the cubic system and most always present the octahedral form. If we were graphite, our carbon atom would form, with countless others, into crystals of six-sided scales. Humans of today got their word 'graphite' from the Greek word, meaning 'to write.' The ancients called diamond 'adamas' because of its unconquerable nature."

"Tell me more," zipped in Nega. "And don't forget to tell me why——"

"Yes, I know," Posi ripped in interruption. "I know what you want to know; but you'll have to wait! Diamond has a specific gravity of three and fifty-two hundredths. In our diamond the atoms are closely packed together with a symmetrical plan. This crystalline arrangement gives diamond its unique physical properties, such as its optical behavior. Light rays, striking into diamond, are affected by the peculiar arrangement of the atoms. The light rays are bent upon themselves. Thus diamond glows, gleams, and glitters in any light. We will be very beautiful when we are cut, ground and have our facets polished! And humans will prize us as something very valuable! Don't you see, my dumb but delectable Nega? Diamond is considered to be very precious and valuable by these foolish earth people—and that's why the poor sap of a human gives a diamond to his female! Now, do you understand?"

"Oh, yes, Posi darling!" trilled Nega. "It's because our atoms are closely

packed in crystal forms—and—because we're going to have our facets cut and polished!"

"Cursa of Eridanus!" rasped Posi. "It's no use trying to explain anything to a woman!"

Nega's sweet patience instantly turned to red rage. She hissed:

"You miserable wretch! You're always belittling my sex. You call yourself a proton! A proton indeed! You should call yourself a moron! Look at your great, lazy mess! You're eighteen hundred and forty times heavier than I! Yet I can balance you—and another big hulk of a proton—in this atom! You're not the only proton in the nucleus! I'll never vibrate again to you—as long as I orbit!"

And thus it continued for years and years; the tempestuous, but utterly delightful course of true love!

\* \* \* \* \*

AS we tellurians think of greatness and smallness, Posi and Nega are very small; but our understanding of dimensions is relative; our opinion is measured by the size of objects which surround us.

The next time you are out in the full moon-light, ask your companions how large the moon actually looks to them! One will say it looks as big as a plate; another, the size of a cart-wheel! The student, knowing the actual size of the moon, will insist that it looks to be a hundred feet across. The mighty sun, when you can safely stare at it through a dense fog-mist, looks even smaller than the moon; but we know that one million three hundred thousand earths could be packed away inside of the sun! Yet how puny and insignificant is our sun compared to the star, Betelgeuse, which is 230 times larger in diameter. And consider Anatares, which is more than 400 times greater in diameter than our sun! And ponder of mighty suns, in



which more than a million of our suns could be packed away!

And now that our minds are in harmony with vast, mighty masses, let us meditate on the smallness of things.

The small period (.) which is printed at the end of this poor sentence is about one-half millimeter in diameter. Let us divide this dot into a half-millimeter in diameter. Let us divide this dot into a half-million parts. We will call these tiny half-million specks "micro-dots."

The perfect human eye can barely see a speck equivalent to about 20,000 "micro-dots." A powerful microscope makes visible the mass of 250 "micro-dots;" the ultra-microscope makes visible particles small as two "micro-dots." Particles smaller cannot be made visible by any known means.

The sugar molecule—one of the larger molecules—has a known diameter of 0.7 "micro-dots." Sugar (sucrose) has the chemical formula  $C_{12}H_{22}O_{11}$ . This tells us that in a sugar molecule there are 12 carbon atoms, 22 hydrogen atoms, and 11 oxygen atoms—a total of 45 atoms in the tiny molecule but 0.7 of a "micro-dot" in diameter!

And, now, if your brain is not weary, consider that each of those 45 atoms are, in turn, made up of many numerical combinations of positive and negative electrons! And think, too, that little Nega, the negative, free electron is 1,840 times lighter than Posi and his eleven companion protons in his carbon atom!

But to the infinitesimal Nega, her atom is a vast solar system! From her relative point of view, the distance from her trim, round mass to her beloved Posi is as great as the distance from the sun to earth!

A lesson here for us struggling humans!

That everything is relative and that we must think mighty thoughts—as vast as the stars are big, and as mighty as Nega is small.

"Here's good news!" rang out Posi, with sudden, sharp vibrations. "A great mass of our glacier has broken off, and it has slid down the mountain. We're now in a rapid mountain stream, and our fine diamond is being carried along by the swift current! Our bad luck has caught up with us again! We're in shallow water; but the current is sluggish and our diamond is not moving. We may be stuck here for eons!"

Posi settled into a deep, blue silence. Nega began to converse with the other five free electrons in the carbon atom.

Some weeks later, Posi increased the speed of his rotation and sizzled out:

"Great news, Nega! A tellurian has found us—at least, his horse has found us!"

"How could a horse find us?" clicked Nega, with excited curiosity.

"The human is a prospector," Posi projected in reply. "He is looking for gold, and he is riding a horse. The animal, in wading across the stream, stepped on our diamond, which has wedged securely in the frog of the horse's hoof. The human has made camp, for the horse is lame from our diamond. Cosmos! Nega, he is gouging our diamond out of the horse's hoof! Izar of Bootis! The fool has flung us on the ground with a curse! Didn't I tell you tellurians are stupid? Now this dumb earthling is looking at a bag of rock specimens that he has collected; he has dumped these worthless rocks on the ground, and they have covered our wonderful diamond! Cosmos! He is picking them all up again; and the ignorant sap has unwittingly scooped up our diamond! Now we're in the tellurian's ore sample bag; and we're on our way to human habitation and glorious adventures! No! the fool is going into the mountains! He is looking for gold—gold—when he is carrying a fortune in his specimen bag! We're going to have a dull time while this dumb human scratches around the

mountains. I'm disgusted! I'm going to sleep for a few months!"

"Gold!" buzzed Nega. "What is gold?"

Posi swelled his tiny mass with smug importance and crackled his loudest vibrations, that all the electrons in his carbon atom might hear his technical disquisition:

"Gold is considered by humans to be a rare and valuable metal. Each atom of gold has one hundred and ninety-seven protons in its nucleus; also seventy-nine free electrons. And, of course, if you stupid electrons know your chemistry, you will realize that the nucleus of a gold atom contains one hundred ninety-seven minus seventy-nine, or one hundred eighteen nuclear or bound electrons. When these silly tellurians get married, the male gives the female a gold ring for her finger. I once lived in a gold atom on ——"

"Oh, Posi, tell me more about the gold ring!" Nega ripped in sudden interruption.

"AZHA of Eridanus!" blistered Posi. "What a fool I was to mention marriage! Shut up, you dumb, but beautiful negative one—and leave me alone! I'm going to sleep!" . . .

"Wake up, Posi!" hummed Nega, some months later. "Potor is vibrating to you!"

"Yes—yes," purred Posi, increasing his rotations; "I was dreaming that I was on Mars again; that I was with Neton again! She was a sweet, young electron! She—what was I vibrating? Now, Nega, I was just joking to tease you—there was no dream. Er—by the way—did—I vibrate in my sleep?"

"No!" snapped Nega. "I wouldn't have listened if you had! I know too much about your past and the disgusting love affairs you've had! All the negative electrons have warned me about

you! You think you're the Adonis of the atomic universe! But you're only an unspeakable, worthless rake! You're a ——"

"Love is blind, and lovers cannot see  
The pretty follies that themselves  
commit."

(Shakespeare.)

"Hold your silly vibrations, woman!" snarled Posi, in quick rage. "Here's important news from Potor. Our tellurian prospector has returned to his home in a large city. He is explaining to his poor wife that he found no gold. His family are hungry and poor; they are nearly starved for want of food."

"Food," flashed Nega. "What is food?"

"Tellurians," gleamed Posi, "have to eat energy in various forms to maintain their soft, weak bodies. We electrons absorb our energy constantly from the mother cosmic rays. Nashira of Capricornus! Our unhappy prospector has dumped his sack of ore specimens on a table, to show his family. He is telling his family that the stones are worthless! If he would only examine our diamond more closely! Cosmos! He is giving our diamond to his small boy tellurian, and the young rascal is placing us in a weapon called a sling-shot! By the Beard of the Comet, this scoundrel has shot us at a tom-cat! This is an outrage—to think that I, Posi, should be fired at a miserable tom-cat! Now we're lying on a sidewalk, and the hurrying feet of humans are kicking us about. But here's that pesky youngster again; and he has picked us up. He is now scratching a window glass with our diamond! His father has discovered the little rogue cutting great lines in the glass, and the father is going to beat him! Wait! The father's attention

has, at last, been attracted to our diamond! The stupid human wonders why a pebble would cut glass; he is looking at us with a magnifying lens! The tellurian is now excited, and is hurrying away with us. Potor says he is going to take our diamond to a human expert in precious stones!"

"I'm so happy," clicked Nega, "for the prospector and his needy family."

"Syrma of Virgo!" twanged Posi. "At last we're discovered to be a diamond by the expert. The prospector is getting a lot of money for our diamond. He is happy; and his wife is crying for joy. Potor says the poor fool is being cheated—that they're paying him only about one-tenth of our diamond's value. But he is happy with all the unexpected money!"

"Money?" projected Nega. "What is money?"

"Money is the medium of exchange used by these humans," hummed Posi. "They have a silly economic system which establishes great, potential, extrinsic values in certain things—and usually things that are quite unnecessary for their actual comfort or existence! Thus their gold, silver, money, and diamonds are eagerly sought; for their ownership means power over other humans. Because of money and its power, organized groups of humans make war on other groups! They call this wholesale murder, war! Imagine us electrons destroying each other! These humans rob, steal, cheat, and murder to gain possession of money and the precious metals! Don't you see, Nega? If tellurians would destroy the value of money and the rare minerals, they would, at once, do away with most of their war and crime!"

"But what would they use for a medium of exchange?" twanged Nega.

"I don't know," clicked Posi; "but I do know that some day humans will be wiser and only use—perhaps the actual

creative products of their brains and wonder hands for money! If I knew the answer, I would be the greatest philosopher in the atomic universe! There will be a time when humans will not value our lovely diamond, except for its abrasive and cutting qualities! But don't worry. The humans certainly covet our diamond now."

"I don't understand what you're vibrating about," whined Nega; "and I don't believe you do!"

"**P**HAD of Ursa Major!" scorched out Posi. "You're fresh for a dumb cluck! What a crust! Talking to me like that! I—Posi, who once lived in a radium atom on Mercury for half-a-million years; and orbited for a million years in an atom on Venus and met all the —"

"Negative electrons!" hissed Nega in quick interruption. "You cad—you hopeless flirt—you faithless wretch!"

"Now, my sweet and lovely Nega," bubbled Posi, "you're the prettiest negative electron I ever met! You—wait! Here's good news from Potor! Our diamond has been taken to a skilled tellurian lapidary. This smart human, with his wonderful, skilled hands, is splitting our diamond's faces along its cleavage lines, to give us the best shape for refracting light. Cosmos! We've lost poor Potor from our diamond. His atom was trimmed away in the shaping process! It's lucky for us that we're almost in the center of our fine diamond. In fact, we're only a billion atoms from the exact center!"

"Poor Potor," blubbered Nega. "What will become of him?"

"His sliver of diamond will be used to make a glass cutter," whirred Posi; "or maybe his fragment will be used to grind other diamonds. Don't worry about him; he may have some nice adventures. Listen to this! We're having our facets ground by a bruting pro-

cess—which means that this skilled lapidary is grinding our facets with the grit of other diamonds. Now he's going to polish our facets. Cosmos! how we will glitter and gleam! Our diamond has been cut in the form of a brilliant and we have eighty polished facets! Potor just told me that our great diamond weighs sixteen carats!"

Nega glowed out a puzzled vibration: "How can you communicate with Potor, now that he isn't in our diamond?"

"I thought you knew," snapped Posi. "You know that electrical energy flows, fast as light, from one electron to another? Well, my dumb one, this same energy current flashes from our atom to the next—and on from molecule to molecule. So we protons, being very wise, simply send our thought impulses along the electrical current, as it flashes along! In the denser elements, such as gold, lead, radium, thorium, or uranium, the messages slow up a bit; there are more protons, per atom, to relay the impulses. When these messages pass out of our diamond mass, they go on and on, transmitted by the protons in whatever element they happen to be. If we're separated too far from Potor, who is now on the tellurian's work bench, it will be slower and harder to communicate with him; but I could vibrate with him, even if he were on the other side of this earth globe! So, I've found a new proton by the name of Polect. He's the oldest proton I've ever vibrated with; he's very wise and has traveled a lot. He was on this earth globe a million, million years ago, when it was a glowing mass of flaming gas—hotter than the sun!"

Many months passed—as tellurians compute time—and the great diamond lay in a famous jewelry house. Collectors and prospective buyers came from far and near to view and admire the

gem. All yearned to possess the valuable and well-guarded stone; and many coveted with crooked, scheming brains.

One dark tellurian night, Nega was startled by Posi's harsh vibrations, as the little proton shrilled:

"Wake up, Nega, here's exciting news! We've been stolen by a tellurian thief! He blew open the door of the safe, in which we were, and took our diamond! He touched off a burglar alarm; the police came, and our robber was shot and wounded while escaping! Now we're in his hide-out, and his moll—a female tellurian gangster—is trying to dress his gun-shot wound. Polect says we're in bad company! Another gangster has come into the room and is demanding to see our diamond. Delta of Andromeda! The newcomer of a crook pulled a gun and shot our wounded crook! The robber who took us from the safe is now dead! I told you that some of these tellurians are a bad lot!"

"Dead!" screamed Nega. "What do you mean?"

"He has died!" pulsed Posi. "His spirit has fled!"

"And what is a spirit?" swished Nega.

Posi considered for a long time; at last, he twanged in soft pulsations: "I don't know what the spirit—or soul—is. Even the aged and wise Polect doesn't know. He says it is that mysterious force and intelligence of life—the life principle—controlled by the Mind of the Universe.

"Spirit is a substance wherein thinking, knowing, doubting, and a power of moving, do subsist." (Locke.)

Truly this poor pen cannot tell the untellable, nor explain the inscrutable!

\* \* \* \* \*

IT is recorded in tellurian history that the possession of certain large and famous diamonds was a record of crime

and death. To own one of these precious gems was to be marked for violence and killing!

So it was with Posi's and Nega's diamond. Its short existence, as a gleaming gem, was fraught with crime and murder!

The crook, who shot the other, took woman and diamond—both equally hard—and hastened to a gambling house. There he expeditiously lost all his cash; and in a desperate, dope-maddened effort to recoup his losses, borrowed a few thousand on the diamond from the dishonest owner of the gambling house. The ill-gotten money was also lost on the crooked gambling devices. The infuriated crook, drug-crazed, shot the woman; but was caught by the police and sent to prison—to await the grim electric chair.

The gambler gave the diamond to an actress, of ill repute, to gain her favor. This light-hearted beauty promptly ran away with a wealthy playboy, to whom she gave the diamond. In a fit of delirium tremens, the gambler drank a deadly poison, and thus filled a long felt public need. The actress quarreled with her rich lover, who choked her to death in a fit of jealous rage. The playboy died from an alcohol-hardened liver; and the diamond was sold by his administrators to close his estate.

A very wealthy and eccentric scientist purchased the diamond at the auction, and took the gem to his wonderful laboratory.

"Alkes of Crater!" blinked Posi. "We've had some exciting adventures! Humans have stolen, cheated, murdered, and committed suicide because of our diamond! But it's well that that bunch of tellurians are dead! Our diamond was the cause of that much good for the earth!"

Nega slowed her orbital speed, oscillated a bit, and twinkled:

"Are all tellurians like those we've met in the last year?"

"No," beamed Posi; "most of them are fine, honest beings. Of course, they're not very smart, for they have the awful handicap of living only some eighty years. We electrons live for millions of years, and some of us are lucky enough to visit other planets; so, of course, we learn a lot. But don't forget, these humans have a primary intelligence—and, best of all, they have those wonderful, fingered hands and also feet with the power of self-locomotion!"

Posi stopped to check his speed; then he purred on:

"These tellurians are a fine race; they're destined to rule the universe. They are fast developing super-intellects, even though their bodies are soft and easily destroyed. With their miracle-working hands and their wonderful gift of self-directed movement, they are the most powerful form of life.

"In the past few hundred years, they have delved with agile fingers and searching lenses into our atomic life. They have made wonderful basic discoveries and greater marvels are to come soon for them. They will soon revise their economic and political system and get rid of their politicians. They—"

"What are politicians?" ripped Nega in interruption.

"Politicians," strummed Posi, at loss for a definition, "comes from the word 'politics'. It's—er—you see, these tellurians have ancient Latin and Greek roots to build their words from. The word 'poly' means many. A 'tic' or 'tick' is an arachnid, of the order Aracrida—a blood sucker! And 'tic' is a tellurian medical term for habitual, convulsive twitchings of the face muscles! So it's quite plain—it's—er—politicians are bloodsuckers suffering from face spasms!" A picturesque, but incorrect derivation.

"HEAVENS!" bubbled Nega. "They should get rid of them! But what is going to happen to us now?"

Posi raised the pitch of his vibrations that all the electrons in the carbon atom might hear, and he crackled out:

"Polect is worried; he says that this rich scientist, who bought our diamond, is crazy; and that he is going to experiment with our diamond. He is going to destroy our diamond! This doesn't look so good!"

Nega's orbit oscillated with her great surprise and sudden worry, as she whined:

"But you told me it was impossible to destroy a diamond; that no acid, or violent oxidizing agent, would touch it; and that it was the hardest thing in the universe!"

"Quite true, I did," ripped out Posi; "but Polect is very wise, and he has just informed me that there is a very simple method of destroying our diamond—by burning in oxygen! Of course, this tellurian scientist may not know this awful secret; and even if he does, he realizes the immense tellurian value of our lovely stone. He would, indeed, be a fool to destroy it!"

"Tell me how our diamond can be burnt," twitched Nega.

Posi glowed an excited purple, as he blistered out:

"Diamond is the most exclusive substance in the universe; but it has its Achillean heel. It's very easy—Polect says—to make diamond undergo chemical reaction. If this scientist would heat our diamond to whiteness and then dip it into a tank of pure oxygen, it would burn up just as would be the case with ordinary coal!"

"And would that hurt us?" zipped Nega.

For some time, Posi did not reply. It was evident to Nega that he was vibrating with Polect. Finally, after

what seemed ages to Nega, he scorched out:

"Naos of Puppis! We're in terrible danger, Nega! This billionaire scientist is a crazy nut! He has spent all his vast wealth buying diamonds! He doesn't want to leave any of his vast wealth for his heirs; so he is spending all he has to build a tombstone! And he is going to make his marble gravestone out of all the diamonds! Think of that! The fool is going to burn a vast fortune in diamonds to make a tombstone for his miserable bones! So you and I are going to be part of a tombstone! I wish we were back in that nice, cold, comfortable glacier!"

"But how can the scientist change our diamond into marble?" flashed Nega.

"Polect has just told me!" screamed Posi. "We're done for! This insane scientist is going to heat our diamond to whiteness and burn it in oxygen! The gas which will proceed from that combustion will be carbon dioxide and nothing else. This rich nut, who wants to have the costliest and queerest tombstone on earth, has built a device, which will lead the carbon dioxide gas through a solution of lime water. This will result in a precipitation of calcium carbonate, which is marble! So, our crazy billionaire scientist will have a marble tombstone made from lime and diamonds! Of all the weird adventures I've had, this is the worst!"

(Author's note: Any skeptical reader is cheerfully invited to test this easy burning of diamond: You take a *large* diamond and follow the instructions given Posi by Polect. As you may have some difficulty in obtaining enough diamonds to construct yourself a tombstone, I humbly suggest when you have reduced your diamond to carbon dioxide gas (CO<sub>2</sub>) that you mix it with sugar, water and vanilla extract and drink it!



For carbon dioxide gas is used extensively to "carbonate" beverages! I did not make a personal test of this old law of chemistry. Adib of Draco! My lovely and talented wife refuses to let me try it with her diamond!)

"When will he do this frightful thing to us?" simmered Nega.

"SALM of Pegasus!" ripped in Posi. "He is heating our diamond now! Hold tight, Nega, as your speed increases with the heat! No; the puny temperature won't hurt us; we've enjoyed heat a thousand times greater than this tellurian furnace will develop. When our diamond burns in the oxygen, our molecule will be broken up! Polect says that nothing will happen to our atom, as far as we electrons are concerned; but hold your orbit tight and fast! By the Rings of Saturn! We're burning now! It feels good—exhilarating! Now we are carbon dioxide. For two atoms of oxygen have grouped with our carbon atom and thus formed a molecule of carbon dioxide! Cosmos! We're going to be plunged into the solution of lime water!"

Nega blinked in terror and screamed to Posi; but the little proton was too perturbed to heed her frantic appeal.

"Apollo of Castor!" blinked Posi, with all his ergs. "We've had great luck! There was a leak in the nutty scientist's device; and a huge mass of carbon dioxide gas escaped! Our carbon atom leaked safely through; and now we're drifting around in the atmosphere! Polect says we've wafted out through the open window of the laboratory! We sure were lucky to escape that crazy tellurian! I wonder what next? I'll talk to Polect!"

Nega waited impatiently for news, while she vibrated with the other five anxious negative electrons in her atom; then she felt Posi's nervous impulses.

"Menkib of Pegasus!" gleamed Posi.

"We've been eaten by a tellurian tree!" "How could a tree eat us?" whined Nega.

Posi proudly swelled his tiny, conceited, whirling mass and whirled in his most officious pulsations:

"A million years ago, I was in a carbon atom, which was part of a carbon dioxide molecule! It was on Venus, where the warm, steaming, moist atmosphere produces a mighty growth of trees and shrubs; where steaming mists and endless, hot rains abound; where strange, men-like, intelligent insects swarm the tropical sphere; where immense, winged monsters soar, with clacking wings, through the soupy air; and where I met Givel—she was so lovely—so young—so—. Oh! Cosmos! What was I vibrating? Pardon me, folks—that was just an orbital slip! Oh, yes, I was vibrating. The carbon atom, in which I lived on Venus, was absorbed by a mighty tree! So I know all about plants and trees eating carbon dioxide. These stupid tellurians call the process by the long name of 'photosynthesis.' It's very simple; try to follow me. Trees and plants need sugar and starch for food. As this tree absorbs our carbon dioxide, it will surrender its oxygen; the carbon combining with the water in the tree cells, will produce formaldehyde; and will then form sugar by polymerization. Or, perhaps, an accumulated mass may be changed into starch. Thus plants and trees get their food by photosynthesis, which is possible only in light and in certain ranges of moderate temperature. And I'm sorry to say, my lovely Nega, that you are now a part of a starch molecule! I had hoped it would be a sugar molecule; but you're sweet enough; and you're very charming!"

"You had better be nice, you rogue!" beamed the pleased Nega. "After what you said about that Givel woman on

Venus, I should be angry! Are we still in our same carbon atom?"

"Of course, my stupid, but pretty one," sang out Posi; "and I don't think we will be in this tree long. These trees live short lives, as we electrons consider time; and something will happen to us soon. And now, my delectable, let's vibrate about love! Move your orbit over closer—there, that's fine! And I'll tell you why the male tellurian gives the female a golden ring when they're married!"

"Oh, Posi!" squealed the delighted Nega.

\* \* \* \* \*

Consider you well, my erudite reader, the marvels of nature's chemistry, which in many ways can surpass man's best efforts.

A temperature of 2,400 degrees Fahrenheit is required, in man's laboratories, to separate the carbon and oxygen atoms of the carbon dioxide molecule. Yet the tiniest flower plant and the mighty tree can easily (without heat) separate these atoms in the tiny cell laboratories of their marvelous chlorophyll apparatus! And these trillions of plant laboratories release the oxygen atoms that they might be breathed again by man and animal! Strange it is that all plants without chlorophyll apparatus are heterotrophic (parasitic or saphophytic).

"God commandeth the natures  
That thei to him obeien alle."

(Gower.)

\* \* \* \* \*

LIFE, its meanings, its purpose, its ultimate goal, was a mighty problem to Posi and Nega—even as it is to you and me.

That infinite impulse, and that incomprehensible, dominating instinct, actuated and motivated Posi and Nega. And the relentless stream of time flowed on-

ward to—where? Man cannot comprehend eternity.

The tree, in which lived Posi and Nega, died from old age—its cycle of life was finished. Life, for Posi and Nega, spun on, whirling and orbiting with incomprehensible speeds. They knew not why; but they continued to spin their infinitesimal part in the mighty, numerical scheme of things, giving their every erg!

The irrepressible Posi was displeased with his dull existence. For days, the excitable proton had disturbed the other electrons in the carbon atom by his shrill, complaining vibrations and the constant vibration of his all-important repellant force. Mumbling impulses of protest came from the other electrons, for Posi was disturbing their timed and intricate rhythm of the atom's movements. Finally, with shrill energy waves that hurt Nega's sensitive reception cells, Posi grated:

"There's one way these cursed tellurians have the advantage of us—they can commit suicide if they become desperate! We electrons cannot destroy ourselves without destroying another electron!"

"Snap out of your bad temper, Posi!" tore out Nega, angry at the proton's ill temper. "Get to your ergal duty! Where's your orbital pride? You're a sullen, spoiled proton!"

"You're right, Nega," sputtered Posi, glowing a deep, shamed erubescence. "I've really nothing to complain about, for you're with me, and you're the most beautiful negative electron in the atomic universe! I—Acrab of Scorpio! Here's news that will startle you: We're being eaten up—devoured—by a pesky, termite ant!"

"Heavens!" twinkled Nega, in great alarm. "What is a termite?"

"A termite," strummed Posi, with smug vibrations, "is a white ant-like

insect of the family of soft-bodied, social insects of the order Termitidæ. They are highly organized insects and very intelligent. If we get into the termite underground nest, we may have some unusual adventures!"

"But how can the termite eat the wood fibre we're in?" puzzled Nega. "Can the termite digest wood fibres?"

"Yes and no!" ripped Posi. "The termite lives on wood fibres, which it eats with its powerful jaws; but it cannot digest the wood pulp!"

"You're vibrating around in orbits!" scolded Nega. "It doesn't make good sense!"

"Control your oscillations, woman!" snarled Posi. "And try to understand. In the termite's stomach are thousands and thousands of tiny, living microbes, which eat and digest the wood pulp, taken in by the termite. The termite digests the by-products from their micro-organisms, and by this fantastical process obtains his needed energy! And, just now, we're being devoured by one of these fearful microbes! Don't worry! This microbe—although he resembles the fearsome beasts which roam on Mars—cannot harm us! His stomach will absorb our starch molecule and break it up into energy; but our carbon atom will remain intact!"

"I thought we were in the center of the tree," projected Nega. "How did this white ant reach our mass of wood fibre?"

Posi glowed his best, pompous, purple and sizzled:

"Our tree died of old age, years ago. Our starch molecule, with millions of others, had been stored in its wood for reserve. When the tree's wood became dry, it was attacked and tunneled into by these termites, which have their nest among our tree roots. Our termite is now hastening away. Pollect says it has received an urgent message to hurry to the nest—that danger threatens its

termitary! These remarkable insects have a mysterious way of communicating instantly with each other! Even Pollect does not know how they do it! Pollect says the ant is fairly racing to reach its nest! This is fine! We're going to have some exciting times! I hope something happens before this termite completes its digestive cycle!"

"What do you mean, Posi?" hissed Nega.

"I can't tell you!" clipped Posi. "You're too young!"

"**M**AIA of Taurus! Here's something real exciting! The termite nest is being destroyed by tellurians, who have poured deadly acids into the tunnels, and have set our tree on fire! This isn't so good. We may be burned and our carbon atom may go up in smoke—as soot! Pollect says the termites are being burned by the thousands! Little do these tellurians realize the high order of organized society that they are destroying! These humans could take a splendid lesson from the system of community efficiency, which the termites possess!"

"Why do humans destroy the creatures?" Nega clicked.

"Because the termites eat the wood from under their houses," snapped Posi. "Cosmos! Our ant has fallen in the blaze! He is a soldier ant and a courageous chap! There! He has escaped the flames and acid; but he is badly burned and can hardly crawl! These ants have an amazing vitality and tenacity of life. The ant realizes, at last, that his termitary is completely destroyed; and he is crawling painfully and slowly up the wall of the laboratory. And it's the same laboratory from which we came when we escaped the insane scientist! Our ant is crazed from the torture of its fearful burns; he is now in the laboratory, and is running about in aimless circles! He——"

"Where is the scientist, who once tried to change us into a tombstone?" sizzled Nega.

Posi flashed a message to Polect; and then he twinkled to Nega with amused vibrations:

"Polect has found out that the insane scientist made his expensive tombstone, and had it all ready for his death; but he took a sea voyage. The boat sank, and the scientist's body was never found! So his priceless marble tombstone was no good to him! His laboratory is still in this room; but now it is the experimental room of a great tellurian hospital. The pain-maddened ant has crawled, with us, to the top of a table, which is covered with remarkable scientific devices. He has discovered a very small opening leading into a tiny box made of glass and lead. Cosmos! Polect says our termite is dying! He's dead; and his singed body has fallen into the tiny box!"

"How long will we be here?" clicked Nega.

"I don't know," rasped Posi. "Polect is silent; he seems worried about this little box that our ant fell into. Here's a message from Polect. Lesath of Scorpio! Polect says we're in desperate trouble! Our ant, in his death struggles, blundered into this tiny box, which holds the hospital's supply of radium! Our ant fell directly on the radium; and our molecule is being bombarded by the terrible *beta* rays, which constantly emanate from radium! It's only a question of time until some of us electrons, in this carbon, are struck by these beta rays and destroyed! Radium is a fearful, dangerous element. We are doomed unless some tellurian removes the ant from this container soon! Even now, many of the awful rays are streaking through the system of our atom! These beta rays—negatively charged particles—are shot, from the constantly

disintegrating radium atoms, at a terrific speed, nearly equal to that of light!"

"Radium," glittered Nega, in great fright, "what is radium?"

\* \* \* \* \*

THE narration of Posi's and Nega's atomic adventures can be no more interesting than the power of the words grouped in this manuscript.

"All the scientist creates in a fact is the language in which he enunciates it." (H. Poincare.)

We struggling humans—peering with our puny microscopes into the infinitely small; and gazing through mighty telescopes at the vast star-sphere—do not yet know the entire secrets of the atom. Theories come and go; some remain when definitely proven to be facts. As the glorious march of science advances, the theories of the composition of the atom become more intricate; but a steadily growing number of facts remain—to become fixed rungs in the mighty ladder of knowledge.

It is to be expected that this asthenic pen cannot properly or adequately describe the involved, but numerically defined composition of the atom.

I trust to you, patient and erudite reader, to let your imagination have free rein; let it soar into another dimensional world; and feel the atomic emotion of Posi and Nega in their conditions, while we gaze into the heart of a radium atom!

\* \* \* \* \*

"Radium," beamed Posi, "is element number eighty-eight in the atomic scale, and its atomic weight is the two hundred and twenty-six protons in the nucleus of each atom. The number of free, or negative electrons is eighty-eight in each atom. The nucleus of a radium atom therefore consists of two hundred

and twenty-six protons and of one hundred and thirty-eight nuclear electrons. The number of the weight in any of the known elements is accepted by tellurian scientists as the number of protons in each atom; and the atomic number of the element is accepted to be the number of free electrons, like your own glorious self. Radium is an intensely radioactive metallic element. Its electrons are always carrying on a savage war—of sort of mad self-destruction! These insane radium electrons are eternally dashing into each other—a sort of cosmic madhouse!

"Most elements above eighty-six in atomic number have this civil war going on in their atoms! The results of this disintegration are the alpha, beta, and gamma rays, which are, in part, tiny particles flying from the fearful impacts of suiciding electrons!

"The beta rays, weighted with heavy mass, are the most dangerous for us. When one of those rays, striking almost as fast as light, strikes one of our electrons, both will be instantly destroyed! The alpha radiation, belching from the volcanic hearts of the radium atoms, consists of helium atoms, stripped of their free electrons. These alpha rays travel only thirty thousand miles a second and are comparatively harmless to us. The gamma rays, issuing from radium's turbulent heart, are purely a light radiation and cannot harm us. Uranium, element number ninety-two, is subject to this atomic self-destruction; it degenerates into radium. The lump of radium which is now bombarding us with the horrible beta rays, will, in time, degenerate into lead."

Posi cut off his vibrations to Nega, and adjusted his reception to Polect's pulsations. In a moment Posi scorched out his strongest vibrations:

"Acamar of Eridanus!" Posi urged out with all his power. "Polect says all

the atoms between us and the cursed lump of radium have been broken up! They have formed a partial protection for us until now. In a few seconds, we will be exposed to the whole fusillade of the horrible beta rays! Hold your orbit true and fast, Nega, my darling! This may be the end for us!"

"I'm not afraid," glowed Nega, with astounding courage, "as long as I'm in your atom! Will you marry me, Posi, if we come through this safely?"

"Wasat of Gemini! You must be love-sick to think of marriage and love when death is so near! Hold your orbit! I'll attract you! Here come the rays—billions of them! Yes, darling Nega; I'll marry—"

Imagine that all the countless millions of stars in the vast milky way system could suddenly dart—projectile like—as a mighty, unthinkable charge of cosmic buck-shot, into our human solar system! Picture, in your mind, the resultant crashing destruction to our solar system! True, many of the stars of the milky way might pass through our system without actual collision; but some of our planets would perish!

Such was the crashing debacle of worlds which occurred in Posi's and Nega's carbon atom. Worlds wrecked! Universes gone berserk! The flashing, coming beta rays of ripping energy literally riddled through the carbon atom! By a miracle, no proton or electron was destroyed for a few moments; then, suddenly a larger beta particle blazed into the atom!

**A** MIGHTY explosion rocked the carbon atom! And yet another!

Posi and Nega felt their orbits shift and change from the powerful shock! Two electrons in the atom had been squarely struck by the beta ray and were instantly gone! Though racked

with agony, Posi and Nega could sense some incredible change—some marvelous transition—in their orbital positions and speeds! The mysterious, immutable law of nature was prevailing, to bring numerical order and precision out of chaos!

"Nihal of Lepus!" blinked out Posi, as he struggled with his wildly oscillating orbit. "Are you all right, Nega? You are—that's great news! Cosmos be praised! The beta rays have stopped! But here's sad information for you! Petrole, one of the positive electrons in our nucleus, was destroyed by the beta rays! He was a fine, young proton. And Calel, one of your negative electrons, was destroyed! What a terrible catastrophe for our atom! I can't get any information from outside our atom, for Plect is busy trying to establish a new line of communication. It's horrible, Nega; millions of electrons have lost their existence!"

"Are they dead?" shrilled Nega.

"No," glowed Posi; "electrons are very hard to destroy. I'm sure that the broken-up electrons became neutrons, positrons, duetrons, or tiny splashes of energy! I don't know much about these neutrons, positrons, and duetrons—even Plect doesn't know. These positrons are even lighter than your own lovely mass! I wonder why the beta rays ceased to bombard us! Some tellurian must have moved the radium, or taken our white ant, or rather termite, away!"

"Heavens!" shrilled Nega. "Are we still in the ant's body?"

"Of course, my dumb one," ripped Posi. "The rays went through the ant's body, as if it did not exist!"

"Oh, Posi!" Nega blinked. "I'm traveling in a strange orbit, and my speed is different! Your mass seems to be nearer! Something has happened to our atom!"

Posi sent hasty messages to the other ten protons now remaining in the atom; his color suddenly glowed an excited purple. He seethed in furious vibrations:

"Nega, my darling, we're in a new atom! You see, there were twelve protons and six negative orbital electrons in the carbon atom. Petrole, the proton, and Calel, the negative electron, were both destroyed! That leaves eleven protons and five negative orbital electrons in this new atom! And that makes us—let's see—my chemistry is rusty. Cosmos!—It makes us a boron atom!"

Nega glowed a happy, charming pink; and twinkled with amorous vibrations:

"Posi, dear, you promised to marry me, if we came through that last peril!"

"DENEBO of Delphinus!" blistered Posi. "Woman, regulate your pulsations! Pull in your orbit! Control your oscillations! The idea of speaking of marriage at your tender age! Besides, I want to get some news from Plect—as soon as the decrepit, lazy, old idiot gets his communication line established! We will speak of love later! I want to know why the deadly radium rays ceased to shoot at us! And I want to know about boron!"

Posi and Nega did not yet know that a human hand had reached into the thimble-sized, glass-lined box. The human hand, grasping a tiny pair of tweezers, had carefully removed the pin-head sized particle of radium!

The tellurian scientist spoke to his assistant:

"We must hurry with the cancer experiment. Here's a dead white ant in the radium container! I suppose it wandered into the box and the radium killed it!"

"(Death's) truer name is 'Onward', no discordance in the roll and march of that eternal harmony whereto the world beats time." (Tennyson.)



# The Gipsies of Thos

By R. FREDERICK HESTER

*This story starts quite a la Dean Swift, almost as if we were perusing Gulliver's Travels. One of the characters starts reading from a Brobdingnagian book and it looks as if he would have quite a long walk by the time he has read a few pages. The readers will find the extravaganza carried out in a thoroughly matter-of-fact manner.*

"THAT girl Sesthon, my dear Therese, has a lot of fun at our expense; and I believe she is so like ordinary mortals as to be full of a kind of mischief. She has read some of our books, and she knows some of our earthly customs, conventions, and so on; and I see a twinkle in her eye when she hints that we should perpetuate our genus here on Thos, else our 'noble' kind will cease to exist on the planet. She may be right, of course—in case we can never get back to Cetar."

So spoke Herschel Mentor to Therese Felestone.

Therese simply blushed a trifle, and turned a wistful gaze across the vast plain—level as any earthly sea—which stretched apparently to infinity before them; then she gazed at some diaphanous cirrus clouds floating high in the heavens, ornamented by the resplendent hues of the rainbows which were almost continuously to be seen on the planet Thos.

Mentor presently arose from the seat on which both were sitting and walked over to a book, lying open before him on the ground. He gave a leap as he approached it—the book was lying horizontally—and jumped onto a page, about four feet from the ground. Then he walked ten paces to the "top" of the

page, and began walking rapidly back and forth across it, scrutinizing closely the strange characters on its surface.

He had almost reached the bottom of the page when he was a trifle startled by something resembling thunder above and behind him. It would have frightened him a great deal had he not often heard it before. It was the voice of Sesthon, a twenty-year old girl of the giant gipsies of Thos. She was laughing heartily at Mentor.

"Why," she began, in her mighty but still feminine intonations, "do you not know that you can read that book far better by setting it up out there in the plain a short distance and looking at it through the wrong end of your binoculars?"

Mentor desisted from his laborious reading of the gigantic volume, and laughing himself, replied:

"Shame upon me, Sesthon, for not having thought of that little trick!" And he ran to the small space-ship some hundred yards distance to fetch the binoculars.

While he was gone, Sesthon took up the vast book between two fingers, removed it about a hundred yards out in the plain, and set it up to face the seat on which Therese was still sitting. Then she returned, reached down and picked up Therese, raised her two hundred feet to her own face, and said to her:



*Sesthon reached down and picked up Therese, raised her two hundred feet to the level of her own face, and said to her: "Why are you looking sad, dear little Earthian?"*

"Why are you looking sad, dear little Earthian? Is it so bad as all that? At all events, please tell me what it is that grieves your poor little heart."

"Oh, nothing so serious, Sesthon," replied Therese. "You know by this time something of the customs of Earth-people, and you probably know it isn't the custom with us for a niece to marry her uncle, and we, the sole ones of our *genus* on Thos, are so related. And if we never get back to Cetar, or if the party of our friends there can never get to Thos—."

The giant girl seemed to read her thoughts.

"Well," she said, "what is the trouble? Why don't you perpetuate your *genus* on our world if you wish? Why do you have such strange customs?"

"I don't know. We just have them, that's all I know. And it doesn't seem quite—well, Herschel is my uncle, anyway."

Sesthon began to laugh merrily, and almost spilled the mite of an Earth-girl off her palm to the ground.

"Hey, you, Sesthon," came the shout of Mentor from the ground, two hundred feet below; "instead of laughing at us so much, won't you be good enough to turn over that leaf for me? How can I ever read the book if I must run so far every time I read a page?"

Sesthon, still laughing, walked a couple of steps toward the book and flipped over a leaf. Mentor, with great interest, resumed his reading through the small end of the binoculars.

But let us leave them here briefly, while we go back to the beginning and come up to this situation in logical order.

## CHAPTER II

**T**HERESE Felestone, now a beautiful and physically nearly-perfect girl of eighteen, had been born

on the planet Venus. Her father, the noted scientist Mark Felestone, had been one of the pioneers of space-travel, and was one of the first Earthians to land upon Venus. Her mother, Doris Mentor, sister of Herschel, was now stranded with her father on Cetar, a satellite of Thos.

Herschel Mentor, her sole earthly companion on Thos, was a tall, handsome and athletic young man of thirty-six. Twenty years before he had accompanied Mark Felestone and a number of other capable scientists and adventurers on their first voyage to Venus, in the space-ship *Pegasus*—he being then a mere lad of sixteen, but one who had already given much promise in the field of science.

Two years after the landing on Venus, Therese had been born. And two years later, after having established permanent headquarters, laboratories, and so on, Mark Felestone and his followers had decided to return to the earth, partly as a simple visit, but mainly to secure a new supply of the then rather rare element 87, called marskite. This, in a complex compound of a salt of manganese with platinum, was the sole catalytic agent so far discovered which would facilitate the disruption of thorium to furnish motive power for the atomic rockets of the space-flier. After two disheartening years of search in the mists of Venus, not a particle of the element had been found.

Landing back on earth, the party had found that the precious marskite had been completely monopolized by a syndicate, partly affiliated with the world government; and none of it was to be had by any private persons, regardless of wealth. So that, for ten long and weary years, Mark Felestone made vain offers of gold, and tried every means of private and political "pull" to secure a small quantity of the element, which

was requisite to his further conquest of space. Only after the lapse of this time, and after having tendered a distasteful bribe which nearly ruined him financially, did he manage to secure the amount he desired.

In the meantime Therese, his daughter of Venerian birth, had been tutored on earth by various teachers. She was now aged twelve; and no member of the interplanetary party—including Herschel Mentor, now twenty-eight—was more eager for the adventure to Venus than she.

The return was uneventful. The good ship *Pegasus* landed them safely on Venus, and the explorations and general scientific work of the party were resumed, and continued uninterruptedly for several months. During this time, the scientists, led by the now famous Herschel Mentor, had created several new compounds by ingenious manipulation of some elements of Venus, which were unknown on earth and were found very useful in chemistry.

ONE important discovery was a new and better synthetic food—so stripped of all elements not necessary for metabolic nutrition that a small tablet of about five grains sufficed to sustain all the vital processes and functions of the human body for about eight hours. Another outstanding discovery was that a compound of platinum with a radio-active actinium—which was plentiful on Venus—synthesized with a small quantity of marskite was threefold as efficient as a catalytic agent, for the thorium atomic engines, as the first compound discovered on earth had been. Thus, according to the calculations of Mentor, the amount of marskite they had been fortunate enough to secure on earth could be made to yield steady and terrific power in the atomic rockets and engines of the *Pegasus* for a period of

at least six years, after which the disintegrators would gradually weaken to zero. The speed of the ship, too, would be augmented threefold by the new discovery; or instead of its former potential speed of 60,000 miles a second, maximum, it could now make 180,000 miles a second—or just under the speed of light.

Of course, this tremendous speed could not be attained except after some months of gradual acceleration; and the ship had never reached its former maximum of 60,000 on the short flight from earth to Venus.

This fortunate discovery of the new compound hastened their departure from Venus. The planet, indeed, was not eminently suited to human existence, with its eternal clouds and oppressive mists; and most of the party welcomed the date on which they would depart. Mark Felestone and Mentor, especially, were hungry for adventure and new explorations; and between them they planned a voyage completely out of the solar system—to find, if possible, in some remote planetary system, a world better suited to human development than either the earth or Venus.

After brief deliberation, they decided upon the nearest star-system—the group of Alpha Centauri. This group was in the spectral class GO, or very nearly that of the sun; and hence there was the probability of habitable planets within the group. They calculated that they could reach it with their new atomic power in less than five years. Alpha Centauri being four and three-tenths light-years distant. And with considerable coasting, which would be possible after passage of the point of gravitational equilibrium between the solar system and that of Centaurus, they figured their motive power would be ample, with even enough to spare for return.

## CHAPTER III

FOR nearly five years, they hurtled across the twenty trillion of miles separating the two systems. After three months of acceleration, they had attained the ship's maximum velocity, and held it steadily with diminished power. One thing they had noticed with some surprise—the gravitational equilibrium had apparently been passed after only a year of flight, for the speed had increased to beyond the calculated maximum with very little power. This signified that the system they were approaching had over twice the mass of the solar system, which in turn meant a long and tremendous expenditure of energy in deceleration.

Another thing astonished them as they approached within a light-year of Centaurus, the astronomer of the expedition began to perceive in the group, not only the dominant binaries  $\alpha^1$  and  $\alpha^2$ , with the dwarf "Proxima," but three other brightly shining, dwarf suns, all of which whirled about the common center of gravity of the system. And when, after two years of increasing use of the decelerating rockets due to the enormous gravitational pull of the group, they had reached to within a billion miles of the outmost planet of "Proxima," a group of variously-sized planets, whirling about this yellow sun, began to resolve themselves. The astronomer in fact found ten of them, and six of them had each one or more satellites.

The expedition had not initially intended to land on any planet attached to this star, seeing that its spectrum on earth had revealed a surface temperature less than that of the sun of the solar system; but as a new spectral analysis in free space disclosed a temperature of approximately 6000 degrees centigrade, or practically that of our sun, the party decided to investigate the

planetary system with a view to landing.

After telescopic and spectral study of a huge globe about the diameter of Neptune, and which was nearly a quarter of a billion miles from the parent star, they decided to make a landing. But the planet's constant cloudiness had hampered their investigations, and on landing they found the atmosphere laden with sulphurous fumes from numerous active volcanoes, and they were forced to depart.

A landing was next made on the largest of the planet's satellites, about the size of Mars; but here the atmosphere was too thin to support life comfortably, and but little water was on its surface—the second failure.

In brief, six earth-months were spent in various landings upon the planets of the system and some of their satellites, and in the endeavors of the party to adapt themselves to the conditions obtaining on the various worlds; but to no avail. Once a stay of four months on a planet of about the size and relative situation of Venus to the Sun, almost ruined the health of the expedition—due both to the insufferable climate, which even far from the equator was too hot, and to an elusive toxic element in the atmosphere.

It became obvious, after this, that none of the members of "Proxima's" system was the kind of world they were seeking. But the Centaurus system had not been exhausted, by any means; they would proceed to Alpha Centauri, now discernible as a small disc about four trillion miles further on.

But what with the vast expenditure of energy in the lengthy period of deceleration, which Mentor had not anticipated; and with the still greater expenditure necessitated by the six wasted months of battling the gravitations of several large planets, he began to be

apprehensive about the fuel. If much more of it should be wasted in the next system, he was skeptical of their having enough to return to the solar system, if that should prove necessary. But there was the possibility of replenishing the supply.

The *Pegasus*, then, was headed toward Alpha Centauri. In twelve months, the outermost planet of the giant sun was reached. Sixteen planets were found to gravitate about it, most of them with satellites. Of the expedition's repeated landings upon these, and repeated disappointments, we may make short shrift. In eight instances they failed—until they came to a satellite of a huge planet almost as large as Saturn, the moon itself being nearly the size of the earth.

THE gravitational field of this planet, with that of the satellite and the great sun itself, was so intense that every available erg of energy in the *Pegasus* was required to effect a safe landing. Mentor began to suspect the worst—that the disintegrators were gradually growing weaker, else all of their braking power would not be required to effect the landing. This seemed to indicate that the ship could probably never take off again, without a re-energizing of her atomic engines. Something must have gone wrong—either with the engines themselves or with his mathematics.

And this, in fact, proved to be true; for when three days after landing on the satellite, and finding its atmosphere slightly too attenuated for very comfortable existence, the party decided to move on to the mother-planet, it was found that the ship behaved too sluggishly to risk bucking the immense gravity of that globe. A landing would be certain to prove disastrous.

But during the three days' of explorations on the satellite, in which Mentor

had mainly searched for marskite, a rich mine of gold had been brought to light by their blastings. This was a delight to the avaricious eyes of Mark Felestone, one of whose objectives was wealth. He was therefore bent upon remaining upon the satellite indefinitely, mining the gold while others searched for the marskite.

But Herschel Mentor cared little about gold; and since his intensive search had revealed no trace of the requisite marskite, he proposed to Felestone that he take a party of scientists and helpers and attempt a landing on the mother planet with the small auxiliary space-flier, the *Mercury*, which was a fortunate unit in the equipment of the *Pegasus*. It would accommodate a party of twenty persons. The distance was found to be seven million miles.

This plan was quickly settled. A group of ten scientists were chosen; and with a crew of eight and Therese Felestone—whose love of adventure would hardly brook her remaining on the satellite—the party was complete.

The auxiliary ship had a cruising radius of only ten million miles; and when the party departed in her, they did so knowing that a return would be impossible—unless by a lucky chance they might find some of the precious element marskite on the mother planet.

A landing on the great planet was successfully accomplished. Its atmosphere proved on analysis to be especially rich—with a strange abundance of the life-invigorating element, ozone. Its climate appeared to be ideal. The light from Alpha Centauri, which was almost at its zenith, was dazzlingly strong and white.

ALL of the party except Herschel Mentor and Therese Felestone were soon out of the *Mercury*, and reveling in the rich and zestful atmosphere;



and shortly all walked away in various directions, in groups, to begin preliminary explorations. Mentor had some checking to do in the ship, and beside him in the observation compartment quietly sat Therese, peering intently through her binoculars at what appeared to be a great city, about two miles distant.

About an hour passed. Mentor and Therese were preparing to leave the ship themselves, and further investigate the apparent city—which Mentor had espied before landing, and he had purposely brought the *Mercury* to rest near it. But on leaving the ship they perceived three of their party staggering toward them, drunkenly supporting each other.

Mentor and the girl helped them into the ship, where they immediately flung themselves on their bunk, clutching the backs of their necks. They mumbled something about the "sun burning their necks." Mentor began to suspect something.

Taking a prism of spar, he went outside the ship, and briefly studied the spectrum of the sunlight. There were many very pronounced ultraviolet and actinic lines. Alas, he feared this fact would prove inevitably disastrous. Why had they not learned this on the satellite?—Then it occurred to Mentor that during the three days his party had remained on that body, the sun had been hidden by clouds! What would happen to Felestone and his party if and when the clouds cleared?

And—of more immediate importance—what was happening to the other members of his own party? They were nowhere in sight. He returned and entered the ship.

The three stricken men knew nothing of the rest of the party; they had separated, and gone in different directions.

Meanwhile, Mentor and Therese did

what they could by way of first aid to the suffering men, and for a time kept them in a degree of comfort; but before noon of the following day all three had died in delirious fever. Nor had any one of the others of the party returned: Mentor had little hope of seeing them alive again. He and Therese were left alone, on a strange, remote planet, swinging around a vast sun which poured into space a large percentage of deadly actinic rays.

They did not venture out of the ship that day. But when the sun had set, they carried the bodies of the dead men a little distance from the *Mercury*, sunk a grave in the soft soil with a spade, and covered the bodies over with a mound.

But to remain secluded in the ship would not do. Their food tablets and other supplies might well last for months, but they must eventually give out. To return to the satellite was out of the question—it was seven million miles away, and they had only fuel enough for another three million miles.

That night it occurred to Mentor that there was a shield against deadly actinic rays; he remembered that whites in tropical Africa had found it necessary to shield their spines against even our type of sun, the blacks, because of their pigmentation, being immune. He therefore got from the supply room some carbon paper and thin, flexible sheets of lead, which he cut into strips four inches wide. Laminating the carbon paper between two strips of lead, he cemented the whole together. Two of these were made, one for himself and one for Therese.

They had little desire to sleep this short night. (Each day and night on the planet were only five hours long, as Mentor perceived by the *Mercury's* chronometer, which was still registering earth-time; a rotation of the planet be-

ing completed every ten hours). They therefore walked out into the bright light of two of the planet's three moons. Taking glasses, they approached the towering domes which they surmised must constitute some kind of city.

The domes rose fully a thousand feet into the moon-lit night. They emitted a glittering reflection of the moonlight which indicated that they were of a polished, glass-like substance. At some distance Mentor and Therese studied the domes through their binoculars.

After a few moments' watching, they saw that there were giants in those days—and in that city! Not a few, apparently, but many of them—mighty beings in the human shape who towered fully two hundred feet or more into the moon-lit air! And the two Earthians noted that the giants were all dressed alike—in flamboyant tunics which displayed all the iridescent colors of the rainbow . . . .

#### CHAPTER IV

**W**E come back now to the opening lines of this story.

Mentor and Therese had been on the planet Thos (as the giants called it) two earthly months when the incidents I have related occurred. They had first entered the city of Ptallia, of the giant gipsies, on the fourth day after landing, their spines protected from the deadly actinic rays by the shields Mentor had made. There they had made the acquaintance of the girl Sesthon and a few others of the mighty beings, and had found them either friendly or, after a brief curiosity, indifferent. Most of the Ptallians who took any notice of the diminutive earthians did so with but brief interest; but a few, and particularly the girl Sesthon, had waxed ever more interested in them as time passed. And the quick com-

mand of English which she had acquired in the brief two months of the earthians' detention on Thos was most astonishing.

And detention is the right word; for Mentor had been utterly unable, after the most strenuous efforts, to find a trace of marskite. Further, he had learned to his dismay that the scientists of Ptallia—and they were highly advanced in science indeed—had never found any of the element on Thos.

At first, after enlisting the giant girl's aid (she had carried him and Therese in a pocket of her silk-like tunic) they had scoured the surrounding plains, but to no avail. (Incidentally, in these quests, he discovered and buried the bodies of ten of his party who had strayed away from the *Mercury* on the fatal day of its landing; the remaining five he never found). Later, he and Therese had flown the *Mercury* even to a vast range of volcanic mountains, some fifty miles west of Ptallia. Vast holes he blasted in the mountain-sides, and gathered samples of all the elements thrown out; but in analyses of all these in the flier's laboratory, he found mainly silicon, various stones, iron, nickel, carbon (in which he found some extraordinarily large and fine diamonds), manganese, traces of gold, thorium and uranium; but not a particle of marskite.

The mean density of the planet was found to be 0.330 that of the earth, and its surface gravity 1.36 that of the earth; hence not many of the heavier elements would have been found on its surface—had it not been for the offsetting fact of the planet's very rapid rotation, with the resulting centrifugal forces. On the equatorial regions, this rapid rotation diminished surface gravity by about 15 per cent. Mentor, who had weighed 160 pounds on earth, therefore weighed about 195 on Thos.

Finding the quest to be everywhere

futile, he had set himself the task of finding a new fuel for the atomic disintegrators, or of devising new engines entirely for the ship. As nearly hopeless as either of these projects was, he nevertheless set about them with grim determination; win or lose, he could only lose for a certainty by inaction.

With these plans in mind, then, he had begun investigations into the exceedingly complex and advanced science of the giant Ptallians, and had persuaded Sesthon to procure for him the most appropriate scientific treatise available—she having already taught him to read the strange characters passably well. It was this huge book on chemistry (its size being proportionate to that of the giants) that Mentor was reading so amusingly—to Sesthon—as we opened the story.

**S**ITTING beside Therese, he peered through the large end of his binoculars at the great volume. He was reading of the mode of operation of an atomic engine developed long before by the Ptallians and employed by them in their wanderings through space. Its operation was so fundamentally different from anything earthly, with which he was acquainted, that he almost despaired of ever mastering its complexities. From time to time he asked Sesthon to explain, as best she might, some difficult passages of the book.

The giant girl sat down on a huge block of stone near the two Earthians, and sat pensively regarding them as Mentor read the book.

She was typical of the womenfolk of Ptallia. When it was said in the beginning that she was twenty years old, earth-years were of course meant; she was in fact, according to the time reckoning of Thos, only five years old, as the planet completed its revolution about its sun every four earth-years.

She was a colossal replica of the ancient Greek goddess, Venus; for despite her gigantic stature, she was one of the most graceful and beautiful beings imaginable. With a round, girlish face, more finely featured than the earthians had ever seen, accentuated in its beauty by a luxurious growth of curly brown hair; and with a bodily form and contour not surpassed by the Venus of Milo, she was a fascinating creature. She wore only the standard dress of the Ptallians—a short, close-fitting tunic of a silk-like texture, which reached not quite to her knees, and draped her contours about with the iridescence of a myriad rainbows—in true gypsy style. Sandals of a tough, flexible substance encased her shapely feet.

The other women of Ptallia—and the great city contained many thousands, far more than of men—were of a kind with Sesthon, though of course some of them showed signs of riper age. They were physically nearly perfect, with a common beauty which was but slightly varied; and all were uniformly about two hundred feet in stature. The men, of whom the Earthians found in astonishment that there were only a few hundred, were also possessed of the Greek-god type of physique. They were from ten to twenty-feet taller than the women on an average, but were only slightly more muscular.

However, let us listen to Sesthon for awhile, and we shall learn some of the whys and wherefores of certain of these odd facts.

## CHAPTER V

**M**ENTOR abruptly looked away from the pages of the book, and glanced up at the giant girl.

"Why, Sesthon," he said, "I see here

that you Ptallians have a space-ship, in which you came to Thos from the planet Raakir, farther out in this system. Couldn't you prevail upon the rulers of your city to have us conveyed back to Cetar in it? It would be only a few days' journey, and we should endeavor to compensate you for the favor."

"No, Earthman, I cannot do that. I'll tell you why.

"Turn your binoculars out across the plain, to the northeast. You will be able to discern the tops of some towers in the far distance. That is the city of Kauni, in the land of Skath. This land's inhabitants are our bitterest enemies. They are horrible, purple creatures, dwarfs, about twice your height. There are over two billions of them, as your figures would have it; and they inhabit a very large area—as you would say, millions of square miles. They have enough area, and yet they covet us these few hundred square miles we occupy on Thos. They are thus uncivilized; and they would drive us away from Thos if they could. Twice in my life they have tried to do so, but as we are more advanced than they, their efforts have failed.

"The latest attempt they made to drive us away was about one of our years ago. They would not dare attack Ptallia in daytime, but massed a huge army at night, about two miles distant, and began to shoot some kind of horrible little pellets at Ptallia. They did not damage our buildings, since their dome-shape and impregnable hardness turned the pellets into the streets. They exploded with puny little puffs, and tore little holes a few feet deep and as many yards wide in our streets. At first we merely laughed; but when the pellets began to come in veritable showers, and began to litter up our streets pretty badly, a few of our fighters got into our space-ship and took it out over

their army. Hovering about a mile high, our ship dropped three of our little atomic bombs in the midst of the ugly Skathians. Their army was almost completely annihilated; and those of the survivors who could run, hastened back to Kauni in the utmost panic. Since then, they have not again disturbed us.

"If you should walk about two miles out in that plain, you would see three holes in its surface, each about a thousand feet deep and twice as wide, made by our little atomic bombs; and on all sides of them are great numbers of white bleaching bones—bones of the Skathians.

"But our observers have recently seen some evidences that the savage dwarfs may attack us again, and this time with better engines of warfare. It is for that reason, my dear little friends, that the rulers would not consent to let our one and only space-ship carry you to Cetar. In less than an hour after it left Thos, the Skathians would be sure to attack Ptallia."

"Sesthon," Mentor began, after a minute of silence, "don't you think you might be able, through your scientific friend, to let me have a chance at working out my problem in his laboratory? I can use some of my own equipment in the *Mercury*; and perhaps your friend might be good enough to offer me a little helpful advice. You see, we have many very dear friends awaiting us these many weeks on Cetar.

"I don't know, little Earthian; I shall try, and I hope I can. And now please excuse me—I must go to my tutor for a lesson in bio-chemistry."

She was gone.

## CHAPTER VI

**D**URING the ensuing week, Mentor got permission from Sesthon's friend, through her in-

tercession, to do some research and experimenting in his laboratory. This was a boon for which Mentor had long hoped; for he was reasonably certain that with the added facilities of a well-stocked laboratory and perhaps some suggestions of a super-scientist of Ptallia, he could evolve some fuel for his atomic engines, or produce new ones of the Ptallian type.

Here, engrossed in his work, let us leave him for a while, and take a few more glances into the Thosian milieu of our story. And we may occasionally have the delectable company of Sesthon and Therese in our casual explorations.

The planet Thos was fifth in point of distance from its parent sun. Its mean diameter was about 26,000 miles. Its polar axis had no inclination to the plane of the system's ecliptic; hence there were no changes in its seasons due to its orbital revolution. Nor was there any means of recording time by its revolutions, except by astronomical calculations.

Indeed, with its almost ideal situation relative to its sun, being about 370,000,000 miles from the blue-hot, giant luminary, and with its rich atmosphere, laden with ozone, it would have been almost the ideal world, for intelligent existence that our Earthians were seeking, had it not been for the menacing actinic rays,\* and another consideration there has not yet been occasion to mention—the terrific, violent storms which too often raged over its vast surface. These often attained tornadic violence; and hence every building in the equatorial regions of the planet's surface had to be built of extremely sturdy materials, and sunk deeply into the

soil or stone of the crust. This explained the comparatively squat structures of the Ptallians—the thousand feet which was their maximum height being only about five times the height of the inhabitants themselves, and on which scale our earthly buildings would never exceed about thirty feet in height.

Several of the tornadic tempests had swept the great plains around Ptallia since our Earthians had landed on the planet. The first occurred on the fifth day after their arrival; and had it not been for the fact that Mentor had on that day brought the *Mercury* up very near the towering outmost structure of Ptallia, the little space-flier would probably have been hurtled helter-skelter across the plains of Thos.

He and Therese were sitting quietly in the observation room when a distant booming caused them to turn their attention toward a towering volcano in the far west, above whose lofty peak a dark cloud hung perpetually.

Within a few minutes, it had multiplied itself a thousandfold, and preceded by a tornadic, roaring gale, and heralded by myriad lightnings and ear-splitting thunders, it came like a million fighting furies across the intervening plains. The low-sinking sun was completely eclipsed, and it became dark as the darkest night. The forked, blinding lightnings rent the atmosphere in a thousand directions incessantly, intermingled with the furious swirls of the stupendous, ebon billows of the sable clouds. The crashing thunders augmented the mighty din of the angry, whirling vortices which cavorted like enraged titans across the plains. Never had our Earthians witnessed such a colossal electrical display—never had they witnessed such a stupendous exhibition of the wrathful elements as this. And when finally the rain came, it fell in

\*It may be relevant here to apprise the reader that the Ptallians needed no artificial protection against these rays. As was later explained to Mentor, the endoderm on the backs of their necks and covering their spines was deeply pigmented, of a purple color, and this afforded ample protection. It was an evolutionary device, rendering the survival of such beings possible in a system illuminated by a sun of the spectral type of Alpha Centauri.

huge globules almost as large as oranges, spattering upon the hull of the space-flier like balls of molten lead. The plains shortly were covered some inches deep in water, which was drunk thirstily by the porous soil as the raging tempest ultimately spent itself in the far east.

**M**ENTOR knew, now, the reason for the abundance of ozone in the atmosphere of this region of Thos. Such tremendous electrical discharges would produce it plentifully, in augmenting the density of the atmosphere's atoms of oxygen by one half, putting three atoms of oxygen in a molecule,  $O_3$ . After the storm had passed, he opened a port, and found the characteristic, pungent odor of ozone had been much intensified. But if this were an advantage on Thos, at what a frightful cost it was gained!

Such tempestuous and electrical violence also explained why there were no trees, and not a great deal of any vegetation, in this section of the planet. Few trees could long have survived.

There were, however, some plants cultivated by the Ptallians; and let us now come back to the present, and take a brief walk with Sesthon and Therese, while the fascinating giant girl tells us of these very extraordinary plants. The two are out in the plains not far from Ptallia; and, as usual, Sesthon is carrying the Earth-girl in an upper pocket of her tunic, the better to facilitate conversation as well as progress—her gigantic pace being too much for Therese. They are walking in a vast garden, thickly growing with a strange plant of a purplish color, which reaches slightly above Sesthon's ankles, or about ten feet high.

"These plants," she is saying, "are probably the most wonderful you have ever seen. Their purplish color is part-

ly due to the unique rays of our sun; and if I have understood some of your friend's books correctly, it is analogous to the green chlorophyll which is stored in earthly plants by your sun. The color of these plants however, coincides with a most marvelous virtue—when they are properly handled by our scientists. A crystalline extract of the active principle of these plants, after they have reached exactly the right maturity, possesses the quite wonderful power of preserving the vital processes of organic beings almost indefinitely. Thus, when a small quantity of the crystals in solution is injected into our bodies, it not only greatly enhances our vital energies, but preserves us from any manifestations of old age at least for a thousand of your years. And the injection need not be repeated oftener than once each year. This explains the youthful appearance of most Ptallians, which you have observed; and it is a further reason why we do not need or permit the lavish marrying of males and females.

"Now we come to quite a different plant, or its virtues are different, although physically it much resembles the other. These are the only two plants we cultivate, and they supply our needs, the one for preservation, the other for food. An extract of this plant, also in its proper maturity, is something like your food tablet: it supplies all the nutritive requirements of living metabolism perfectly. And, as in the case of the youth-preserving plant, it is indigestible to this planet, as to all others, with their habitable satellites, that we have visited in this system—and we have visited most of them. Both have evolved as peculiar products of our sun. However, they do not grow very well in the wild state, and when intelligently cultivated are greatly superior; hence these gardens."



“ONE question,” interposed Therese, how do these truly wonderful plants withstand the terrible storms of Thos?”

Sesthon kicked one of the plants with her foot. “See,” she said, “they are flexible and resilient, like your rubber. The storms therefore cannot injure them, else they would not survive a month.”

“And, good Sesthon, will you not be kind enough to give us some of the wonderful preserving crystals?—Even if we can never leave Thos, I, at any rate, should like to remain youthful for a thousand years!”

“Yes, of course, my dear little friend. Only a very small quantity of the crystals is required. But you do not need it yet?”

“No, no; but I may within a few years. I never want to age beyond twenty-five! But tell me, Sesthon, if you Ptallians like to live so long, just what do you do to enjoy life? You have said that none of you is required to attend to any duty longer than one hour each day; how do you pass the rest of your time? Do you never become bored?”

“Oh, no!” laughed the giant girl. “The idea! Our lives are intelligently ordered; we are never ill; we very rarely have any painful accidents, and we get along peaceably with each other. We are devoted to literature and science to as great an extent as you, and you have yet to appreciate our possession of this devotion. We are not intellectually idle. We have many and very exciting games; we have special geniuses who delight in creations of literature and art to enhance the general happiness. Besides, what is there to make us unhappy, or even bored? Shall I take you to a game of zaakin, as we call it, to-day?”

“Yes, yes—by all means! I’ll be delighted, dear Sesthon!”

“Don’t be so sure about that—until you see the game! It is delightful enough—to us. But I’ll take you.”

So saying, Sesthon retraced her gigantic steps through the gardens, and soon approached one of the towering domes whose glistening, sable uniformity was due to one of the obvious characteristics of Ptallia. Opening a vast door, three hundred feet high, she strode through a corresponding corridor into an enormous court, surrounded on all sides by the domed structures.

It comprised perhaps ten acres, of which the ground was bare, hard-packed, and perfectly level. At the base of the buildings, on all sides, were several tiers of colossal seats, resembling those of an ancient Roman arena.

Several hundred of the giant women of Ptallia were scattered among the seats surrounding the court. Sesthon found a vacant seat commanding a good view of the whole court, and sitting down, adjusted Therese in her breast pocket so as to permit her a fine view of the game—whatever this was to be.

THEY had not long to wait. Therese felt a growing apprehension of something terrible on the issuing from the opposite side of the court of some deep rumblings, as of distant thunder; and she felt a slight trembling of the ground. Presently, a gigantic woman emerged from a corridor whence the rumblings issued; and the thing she led with one hand by a collar would have frightened the devil himself. And it is no wonder that Therese, a girl of the earth, who had never before witnessed such an unearthly phenomenon, covered her eyes with her hands, and sank down into the protective depth of Sesthon’s pocket.

“Oh, come on up out of that!” laughed the giant girl. “You want to see the game, don’t you? Don’t be afraid!

Nothing will harm you!"

Therese timidly and tremblingly raised her eyes over the top of Sesthon's pocket. She saw many other women entering the great court, all leading things like the first. They came on into the court—scores of them, and having entered, ranged themselves into two opposite rows, facing each other.

Therese, with wide, staring eyes, began to appraise the things indescribable, which apparently were to take some kind of part in the "game." They were some kind of beasts, fully seventy feet in height and two hundred feet in length. The mighty dinosaurs of the earthly Cenozoic age would have been dwarfs beside the creatures. Their tails and colossal bodies somewhat resembled those of earthly lions! but their tremendous, horned heads and thick necks were more like those of the mythic Minotaur than anything else Therese could recall. One of them let loose what was a half roar and a half bellow, which sent a tremor through the ground, and caused the Earth-girl to clap her hands tightly over her ears.

"Good Sesthon, please let me know if one of the things starts to do that again," she pleaded.

Sesthon was only laughing. "She's got a great deal of fun out of me," thought Therese. After Sesthon had laughed until the tears streamed down her features, she began to explain:

"Those beasts, which we call bantirs, are used in the game of zaakin as mounts for the players. They are domesticated, and we have them under good control, so don't be alarmed, little friend. We brought a pair of them from Raakir, many years ago, and they have been permitted to reproduce until now we have over a thousand of them. We use them mainly in games, and they are well trained."

But the "game" had begun now, and

it was a stupendous thing. The women mounted the colossal bantirs astride, and holding a kind of polo club in their hands, urged the immense beasts hither and thither over the surface of the court. The players were knocking huge balls around; and so far as Therese could tell, the game somewhat resembled polo. But as the women warmed up to the fullest zest and began shouting and laughing while astride the vast, lumbering beasts, which caused a minor earthquake as they pranced and galloped over the court, the frightful pandemonium and unearthly scene became too much for the nerves of Therese. Again she retired into Sesthon's pocket, and this time she could not be enticed out any more.

When she had finished laughing, Sesthon said: "Have you had enough of the zaakin, little friend? If so, we will go to my apartment, and have some refreshment."

"A great deal more than enough have I had!" replied Therese.

And to the mighty chambers which Sesthon called her "apartment" they went.

## CHAPTER VII

IT was two days later, in the early evening of the short day of Thos, that Mentor, Therese, Sesthon and her scientist-friend, Zreno, sat conversing near the astronomical observatory of Ptallia. A lofty table had been placed for the two diminutive earthians, carrying two small chairs on a level with the faces of the two giant Gipsies. Sitting on these chairs the Earthlings could converse very pleasantly.

The nearest moon of Thos, the only one now in the heavens, cast a lurid light over the city of Ptallia; but in another hour it would sink below the horizon, leaving the city in darkness.

The conversation had turned from science to the subject of the supernatural—as so often happens on earth. And Mentor, desiring to learn if these supermen of Ptallia had any kind of religion, had been explaining some cardinal theological doctrines of the earth. Although Zreno, in his association with Mentor and Sesthon, had easily acquired a considerable English vocabulary, it was a bit difficult to convey to him exactly some earthly theological doctrines; but finally he seemed to reach an understanding of the hypothesis of theism, and in response to a question put by Mentor, expressed himself as follows:

"We do not have, and have never had, so far as our history records, any belief in that kind of supernaturalism. That is, we do not recognize any omnipotent, omniscient, omnipresent being in the Universe; but I personally have an hypothesis which may be of interest to you. Briefly, it is this; the Universe itself, or that part of it you are pleased to call the 'sidereal system,' may be some kind of stupendous, organic being, but one whose magnitude is too vast for any clear, finite comprehension. After five hundred earth-years of close scrutiny of the heavens, I have been led to this hypothesis by many considerations, too numerous and complex to mention now; but the supreme one is a phenomenon I have steadily observed in a remote system beyond the Milky Way. Strangely enough, perhaps, I have rarely observed it through the small end of the telescope, but through the large end—that is, I have greatly diminished it instead of magnifying it.

"When that moon sets, we will go into the observatory, and I will show it to you.

"MEANWHILE, I may say that it exhibits the general shape of a finger, apparently attached to some

mighty hand of inconceivable vastness; and during the five hundred years of my observing it, the finger has quite appreciably assumed a definite curvature, much as does the human finger in grasping an object. This cannot be seen, of course, except by diminishing the group of trillions of stars very pronouncedly; and I may add that such diminution proportionately slows down any observable movement made by the finger, or any astronomical phenomenon.

"Now when we bear in mind that the atoms composing any organic, living beings are composed of electrons, protons and neutrons, which are *relatively* as far apart as the spheres which exist in space, it becomes plausible to us that our sidereal system may be a super-being, possibly sentient and intelligent, analogously to ourselves. Its movements, too, in accordance with my long observations and calculations, turn out to be, again *relatively*, quite as rapid as our own. This is a highly significant fact."

He paused. Mentor and Therese were more or less awed by this extraordinary hypothesis. Finally Mentor asked:

"Do you mean, then, that perhaps the spheres themselves are protons, electrons and neutrons, composing the atoms of this transcendent super-being; and if so, how can you dispose of the many molten and gaseous suns in such an hypothesis?"

"That, my friend, is exactly what I mean; and the heat of the suns you mention does not present a difficult problem. The protons of your own body, *relatively speaking*, are as hot as the hottest suns; and besides, bear in mind the fact that they are relatively as distant from their electrons as the suns of macrocosmic space are distant from their planets. Hence, the infinitesimal heat of the nuclei of your protoplasm is negligible, and cannot in any way harm the electrons or neutrons. And what-

ever the ether may be—it seems to be a different order of existence which we may never be able to comprehend—you are mainly filled with it yourself, as much so as is the Universe, proportionately to your size.

"But the moon has now set, and we may proceed to the adjoining observatory."

He arose, grasped Mentor, chair and all, between two fingers—Sesthon doing likewise with Therese—and they entered the observatory. Zreno adjusted the small end of a giant refractor toward a certain region of the sky, and held Mentor in his chair up to the objective, which was now the eye-piece.

A few seconds' close scrutiny of the image, and Mentor exclaimed, excitedly:

"Yes, sure enough, there it is—there even seems to be a nail on the finger! And it is curved, as Zreno says!"

He peered into the telescope several long minutes, fascinated, astounded. Finally, Sesthon gently suggested:

"Pray, let your little friend take a look, won't you?"

Mentor sprang away from the telescope.

It was now Therese's turn to view the awful spectacle. But she was in no hurry to do so! Her girlish mind was hardly prepared to assimilate such vast and mysterious conceptions.

She buried her face in Sesthon's bosom, trembling. Followed some thunderous laughter, with Zreno joining in this time.

"Have no fear," he finally said; "it is many thousands of light-years distant—and as it appears in that telescope, more than a million."

And he held her chair up to the eye-piece. Therese took a single hasty glance—and buried her face in her arms.

## CHAPTER VIII

THE following day and for several days, Mentor and Zreno continued their work in the latter's laboratory. The great Ptallian scientist, from a passive interest in the Earthman as of trivial importance, after some days of acquaintance had become deeply interested in him and his immediate problem. On an immense laboratory table a hundred feet high, to which Mentor climbed by a ladder, he and Zreno worked together; the Ptallian often using a huge magnifying glass in his work, so relatively small were the instruments and materials with which Mentor dealt.

Although with Mentor the work was wholly experimental, deprived as he was of the requisite marskite, Zreno was somewhat more abstract and theoretical, and with complicated calculations was seeking a substitute for the element solely by mathematics. This they had decided upon, rather than reconstruction of the disintegrators after the Ptallian design.

"If my calculations are correct," he said to Mentor one day, "I have found a passable substitute for your rare element. It is of the atomic weight 246.4, and we call it thakir. It is somewhat less stable than element 87, since its ionization proceeds rather more rapidly in the presence of the catalytic agent you use, and two of its outmost electrons will be transformed into energy almost precipitately; but it is very nearly the same as your 87. This element is very plentiful in a rather remote section of Thos; but I have enough here in the laboratory, perhaps, for your immediate needs."

With a staunch faith in his mathematics, Zreno proceeded to use the element "thakir," (which in our scale

would probably be No. 94) in the chemical combination necessary for the operation of the disintegrators. It worked; but it worked just a fraction too well—due to its lower stability, as Zreno had calculated. (In the disruption of the thorium, the platinum alone of the three elements employed as a trio-catalysis remained absolutely unchanged indefinitely, there being a difference between sub-atomic and molecular catalyses). The action of the new element meant two things: that the disintegrators could be operated with it for a briefer period of time, and also that they would be energized with greater power.

Mentor nevertheless was elated with the discovery, since the increased power could be taken care of by proper reinforcements; and as the "thakir" was approximately 60 per cent. as stable as marskite, he could easily reach the satellite, Cetar, without any great store of the fuel.

When the reinforcements were complete, two days later, Mentor and Therese tried out the *Mercury* in a test flight. (Neither of their giant friends could accompany them, of course—Zreno being barely able to thrust a hand into the air-lock of the craft). Spreading the wings of the ship for atmospheric action, they rose into the air of Thos and headed toward the "land of Skath," as Sesthon called it. The engines with the new element were remarkably lively and responsive—so much so, indeed, that Mentor feared they might be damaged by the excess power.

High over the city of Kauni they hovered for several minutes, utterly astounded at the spectacle below them. The shining domes of the city seemed to stretch to infinity. Mile after mile they reared their glistening, rounded shapes. Hovering closer, the Earthians peered at the city with their binoculars.

The inhabitants could easily be seen—being in the human shape, but of a light purplish color; and as Sesthon had also said, they were about twelve feet in height. Swarms of them began to appear in the geometrical streets, gazing upward; and when presently some kind of projectile began to shriek in close proximity to the ship, Mentor lost no time in darting toward the sky. Warlike, evidently, these Kaunians!!

Mentor gradually brought in the wings of the craft as they shot upward five hundred miles into outer space. Then, after a satisfactory test for speed, something began to go wrong with one of the *Mercury's* disintegrators. He had expected it.

But almost angrily he made the rapid descent to Ptallia. No flight to Cetar would be possible with a mal-functioning engine.

Back in Zreno's laboratory, he found that mechanical damage had been done to the disintegrator, due to the "thakir." Some days would be required to repair it; and Mentor set grimly to work.

TWO nights later, as he and Therese were sitting near the *Mercury*—they lived mainly in the ship, rarely staying in Ptallia—enjoying the pale, reflected light of Cetar, they were suddenly astonished to perceive in the eastern sky long streams of flame, apparently issuing from a large space-flier. A few moment later the craft, whose hull was now discernible in the moonlight, landed on the plain a few hundred yards distant.

Who could this be, and from where? Could it be, by any remote chance, Mark Felestone and his party? They would see.

They arose and walked rapidly across the plain toward the ship. Presently they saw the air-lock open, and in the brightly-lighted interior appeared

several human beings. Two men came out through the lock, followed shortly by others.

The meeting was (at first) a happy one—for the ship was none other than the *Pegasus*, and it had brought Mark Felestone and his party. No, that is not quiet correct. Mentor and Therese learned with sorrow that eighteen of the total of thirty who had remained on Cetar had died. There were only twelve left now—nine men and three women. Of these Mark Felestone and his wife, mother of Therese, were two.

But what could be the matter with the men? They were emaciated almost to skeletons, and ghastly pale. And they were acting as would children—laughing and waving their arms about, as if mentally deranged. Mentor and Therese began to stare at them wondering.

Felestone finally explained: "We almost died ourselves. The women remained most of the time in the ship, and so they fared better. The air outside was too thin, in the first place; and we men were almost asphyxiated several times by a gas from a neighboring volcano, while we were working in mines, and which gas could not be kept out of our lungs by any mask I could devise. The eighteen who died were mainly killed, I think, by actinic rays, for we began to develop meningeal symptoms ourselves, until I plastered carbon over our neck and spines. But I found a lot of gold—before I finally discovered a strange element which I had never seen before. It resembled marskite, and I found it efficient as a substitute in the ship's disintegrators, though considerably more energetic."

"But this air is delicious, and we are oxygen-starved. Excuse us for acting like children!"

After some minutes of reveling in the rich air, the group returned into the

ship. For the next hour or so, they were mutually busy putting and answering scores of questions. Felestone explained that he had circled the planet twice, before finally locating with his glasses the city of Ptallia and the *Mercury*; and also that he had fueled the *Pegasus* with enough of the new element to last over five years.

Several days were required for the men to regain their strength and stamina. Meanwhile, Mentor and Zreno had completed repairs of the auxiliary craft, doubly reinforcing the engines to preclude a repetition of the former trouble.

Mentor had already told Felestone of the elements he had found on Thos; but when he showed him the fine large diamonds he had found in the volcanic mountains, the eyes of the elder man were opened wide indeed.

"Why, young man, you would have a fortune on earth even with those few stones!" he exclaimed. "And you say there are plenty more like them? Then take me to that diamond mine as soon as possible!"

So, early next morning, the *Mercury* was tested out in a flight to the mountains. In it were Mentor, Felestone, and other men of the party. Under the avaricious zeal of the elder man, they secured, in the five hours of the Thosian day, a large number of excellent stones. But this was not enough for Felestone: they returned next day, and several days thereafter; until the stones they secured were worth, on earth, millions of dollars. (Mentor had learned that the Ptallians, who wore no stones as ornaments, and apparently had no use for diamonds otherwise, regarded them as of no great value).

SIX months passed. The earthians had explored much territory of Thos, and had mixed rather freely with



the Ptalians, learning a great deal of advanced science from them. And through the medium of Sesthon, Therese had been able, several months before, to obtain some of the extraordinary crystals of the plant which would preserve youth. Every member of the party, except herself and Herschel Mentor, had taken injections of it, the latter postponing the dose until after he had consulted Zreno as to the almost incredible virtues of the extract.

"That extract," explained the gipsy scientist, "has three specific effects upon the human organism. It sustains in the body powerful enzymes, the important catalytic agents which have so pronounced an influence upon chemical changes in protoplasm; it precludes deposition of excess calcium and other salts, and checks hardening of the arteries; and it acts in the blood-serum as a potent antiseptic, destroying all pathogenic organisms and maintaining equilibrium between cell-growth and nutrition, cell-decay and death. Just how it does these things I can hardly explain to you, with your elementary scientific training; nor can the formula of the extract be expressed in terms of your chemistry, since there are two substances present for which you have no symbols. It is, however, perfectly safe, in proper yearly doses hypodermically—else of course we should not have been using it regularly for over five thousand years."

"And will it make mother and father young again?" asked Therese, who was present.

"No, it cannot make any person a day younger. But it will tend to keep them from aging further, for about ten centuries."

"Hooray! Then, Herschel, you can remain thirty-six for a thousand years!"

Mentor somewhat doubted it; but he took an injection.

As for Mark Felestone, his dose had so invigorated him that he became almost a different man. He gloated over his large collection of diamonds (now ignoring the gold he had mined on Cetar), and began to dream of returning to the earth with them, and of there enjoying immense wealth again.

He expressed this project to Mentor—repeated it, and reiterated it; until it became obvious that he was firmly intent upon carrying it out.

The plan was finally agreed to by the other members of the party—Mentor and Therese being the sole ones who manifested much hesitancy or regret. They had become rather closely attached to Thos and some of its big-hearted and super-civilized, giant gipsies. But, on Felestone's firm promise to return to the planet after a few years on earth, the two demurrers acquiesced.

IT is two weeks later. The *Pegasus* had been put into shipshape, stocked with every need of the now small party of fourteen persons; the *Mercury*, well supplied with "thakir," was in the hold of the great ship, and the thoughts of most of the party had turned earthward.

It was but a short distance out in the vast plain near Patallia—the plain level as any earthly sea—that several towering giants stood, among them Zreno and Sesthon. Beside them, its shiny upper surface almost reaching to their heads, rested the space-ship.

Held aloft by Sesthon and kissing her great cheek while shedding tears, was Therese; and even the giant girl herself let fall a few drops. They had become warmly attached to each other.

"You must promise," Sesthon was saying, "to come back to Ptalialia. And promise to take the injections regularly—when you are old enough to begin!"

"I promise, dear Sesthon."

Herschel Mentor, too, was lifted aloft, kissed the girl's cheek, and made a similar promise.

Shaking of hands was, of course, out of the question; but Zreno, kneeling down, covered the heads of the entire party with his gigantic hands, and in his thunderous tones, he pronounced the single word:

"Happiness!"

He rose. The party entered the ship, waved a final farewell at the giants, and closed the air-lock. The great ship quivered as her atomic disintegrators thundered into action. She rose into the air, and describing an arc, headed in the

general direction of the solar system—and of earth, over twenty trillion miles away. Five years later, or in the year 1986, she was scheduled to arrive.

Herschel Mentor and Therese Felestone stood in the observation room gazing wistfully back at the city of Ptallia. It rapidly diminished to a mere point in the vast plain. Mentor turned smiling to Therese.

"What is that you are clutching so tightly in your hand, Therese?"

Smiling, she opened her hand and held out a vial to him.

It was filled with the youth-preserving crystals of Ptallia.

THE END

## The Fastest Flyer in the World

THE illustrations give you two enlarged views of the fastest flyer in the world—the *Cephenemyia*, a bot-fly. One observer who saw them in flight, says: "About the only impression left on the eye was that of a streak of orange

It is difficult to secure specimens, but at low temperatures they are sluggish, and can be caught. Sometimes the larvae are captured and kept until they are fully developed into the fly so as to obtain specimens. The flies eat nothing,



Photo by P. W. Mason.

or reddish and black, the red dominant." They infest deer, the prong horn antelope and other ruminants. It is about the size of a bumble bee. It is credited with a speed of four hundred feet a second, and it can probably maintain its flight for hours.

as they feed when in the larval state, they seem to live on the memory of other days. At the estimated speed, a *cephenemyia* could go around the world on the parallel of New York in about 17 hours.—*With acknowledgements to the New York Entomological Society.*

# *In the Realm of Books*

Conducted by C. A. BRANDT

**BEFORE THE DAWN OF HISTORY.** By Charles R. Knight. Published by Whittlesey House-McGraw-Hill Book Company, 330 West 42nd Street, New York. 119 pages. \$2.50.

At times an author's fancy takes the reader into prehistoric jungles, peopled by early man, battling his way upward against the tremendous odds furnished by the unwieldy beasts and rapacious monsters which dominated the earth millions of years ago. Some authors with low-powered imaginations picture another planet, usually Venus, as being overrun with dinosaurs of all kinds, including Tyrannosaurus Rex, and the very unpleasant Sabre-toothed Tiger, etc., etc. Occasionally we have printed stories with prehistoric themes, our artists doing their best to give our readers an idea of the ferocious appearance of the monsters of the past. When I read the announcement of Mr. Knight's book I thought that the same would be a real treat for such of our readers, who could afford to purchase it. But I was sadly disappointed, when I saw the book. I do not wish to create a false impression; I am not finding fault with Mr. Knight or his pictures, which I admire tremendously. He is, in my opinion, THE best painter of prehistoric subjects the world has yet produced. His paintings adorn the walls of many of our finest public buildings. Some of his most magnificent paintings are reproduced in this book, but so very poorly indeed, that it looks as if a printer's apprentice had been told: "Go ahead and rush it, and do the best you can."

## Some Interesting Books for Our Younger Readers

Browsing around in a book store, I came across a series of juveniles, dealing with Science Fiction, published by Grosset & Dunlap, 1140 Broadway, New York, to wit:

**THE MYSTERY MEN OF MARS.** By Carl H. Claudy.

Three young daring adventurer-scientists take off from earth in a rocket driven steel sphere. After the w. k. happenings in space they arrive on Mars, where they have exciting adventures with gigantic mechanical bugs.

**A THOUSAND YEARS A MINUTE.** By Carl H. Claudy.

The old Professor Tempometer takes the same daring adventures into prehistoric times. We have the most thrilling adventures with

Sabre-toothed Tigers, Dinosaurs, Apemen, etc., in the steaming jungles of the past.

**THE LAND OF NO SHADOW.** By Carl H. Claudy.

This is an adventure into the fourth dimension, where our boy heroes find themselves stranded through the treachery of the famous crazy scientist. They have very weird adventures indeed, but luckily manage to escape. Then very humanly they virtually throw the crazy professor into the fourth dimension and completely wreck his machine, so this person is very satisfactorily eliminated.

**THE BLUE GROTTO TERROR.** By Carl H. Claudy.

This book deals with "X," an explosive of truly fantastic power. A jealous scientist tries kidnapping and arson in order to get hold of the formula. After the inventor has blasted a twenty-mile-deep hole into the earth, the villain almost succeeds in capturing inventor, and formula as well as the vast cavern filled with gold, which the explosion has uncovered. However, the heroes escape, and by destroying the shaft, the villain is sealed forever in the gold cave. Also a very satisfying end.

All of the themes of above mentioned books are more or less "old stuff" to our readers, but, nevertheless, I am quite sure that these books will be of interest to our younger readers. They are more or less fundamentals as it were, and are like stepping stones, leading up to an understanding and appreciation of stories written by Science Fiction masters such as Smith and Campbell. The books would make excellent gifts, being inexpensive, retailing for about fifty cents each.

**LOST ON VENUS.** By Edgar Rice Burroughs. Published by himself at Tarzana, California. 318 pages. \$2.00.

"Lost on Venus" is a continuation of "The Pirates of Venus." As usual in Burroughs' books, one is confronted with a positively bewildering array of ever changing scenes and situations of which it is not possible to give a clear synopsis. Suffice it to say that Carson rescues the lovely Duare from dozens of tight spots, and they make their final escape from the kingdom of Havatoo in a stolen atomic flier, and while they are traveling towards Duare's homeland the ice surrounding the heart of the princess melts and she confesses that she is in love with him.

# DISCUSSIONS

In this department we shall discuss every month topics of interest to readers. The editors invite correspondence on all subjects directly or indirectly related to the stories appearing in this magazine. In case a special personal answer is required, a nominal fee of 25c to cover time and postage is required.

## The Reprinting of the "SKYLARK" Stories— the Good Old Days Editor, AMAZING STORIES:

Through your courtesy in printing my letter in the February issue, I have succeeded in obtaining the first "Skylark" story by Edward E. Smith. After reading it, I am very much surprised that you have not yet reprinted it. Certainly every reader who has not read it would more than eagerly buy every issue in which it appeared. As to those who have read it—well, let me tell you that though I just finished reading it, I would gladly purchase any issue in which it appeared as a reprint merely for the pleasure of reading it on different paper and with different illustrations! On the last installment, the editor predicted that that story would live for many years to come. I remember reading a letter in a 1929 issue which very much doubted this. It is still very much alive, but a reprint of it now would cause you to be deluged with letters praising it. Bring back the original Richard Seaton, not the slightly mechanized Seaton of the later "Skylark" stories!

In one of the same issues is also another story which could very well stand reprinting. I refer to the story, "To the Moon by Proxy," by J. Schlossel.

Let me give you a reassuring discovery. In exploring the "Discussions" column of one of the 1928 issues, I was very much amused by one letter. It ran something like this: "The magazine is much too large for convenient handling; the staple method of binding makes it cumbersome, etc., etc." I mean no reflection whatsoever on the author of this letter, but merely wish to point it out as one of many showing that the criticisms were much the same in those days (commonly called "the good old days" of AMAZING STORIES), as they are now.

Taking all things into consideration, I have concluded that the term, "good old days," means nothing more than a period at least three years back from the present. Strange, that the readers of a *futuristic* magazine should worship the *past*, isn't it? Believe it or not, but I am convinced that in four years of time, the good year nineteen-hundred and thirty-five shall be prated over as the unimpeachable "golden age." Therefore, if anyone denounces you for "rotten paper, lousy, invisible type; bleary illustrations," etc. *ad nauseam*, simply plug up your ears, knowing that what you do

now shall be the standard for everything that's holy, four years from now!

Here are a few criticisms on various interplanetary stories. Here is an example of the type of criticism I most enjoy in the Discussions column.

First. In almost every interplanetary story, space is described as being a deep black, with stars scattered about here and there. But just stop to think on this point a little. Space is supposed to be infinite, filled with an infinite number of stars. Space in no way refracts the light of any one of these; therefore the light, perhaps even from the very very remotest conceivable, would reach the eye. Now, even though the light from some of the farthest would not be much to speak of, it still ought to produce some hazy effect, a *glow*, however faint, but still not an absolute black. Certainly the infinite number of stars in space would cover the entire sphere of vision.

Second. The danger of asteroids and meteors is, I believe, stressed too much. Certainly one of the marvelous spaceships in the stories could travel outside the plane of the ecliptic and thus out of most of the danger from these.

Readers, please do not suggest a plot about travel to the "supra-world," i. e., the world of which our solar system is supposed to be an atom. I have seen no less than three suggestions for this, and two stories—"The Light From Infinity" in "AMAZING," and "Colossus," in another magazine.

I'll have to close this letter now, before I pound the typewriter to pulp in my excessive enthusiasm. Yours until A. S. is no more.

Oliver Saari,  
1342 First St., S. E.,  
Rochester, Minn.

(We have been giving full consideration to the reprinting of the "Skylark" stories and have opened correspondence on the subject, but—and it is a very big but—we have so many stories of high merit awaiting publication, that this operates to interfere with republications. Your point of view about the "good old days is well taken. The writer lived in "the real old days"—no telephones, no automobiles, no onboard motors for boats, you had to row or rely on the wind, in those days a trip of ten miles on land meant an hour's driving if you had a good horse, but a great deal more with the "family steed." The writer used to work by candle light, or by oil lamps. Then the electric light began to make its appearance

with desperate attempts to produce it in small units, until the carbon filament lamp solved a famous problem of those days, a subdivision of the electric light. Then came the tungsten filament lamp which gave three times the light of the carbon filament lamp for the same expenditure of power. You may believe one who lived in those good old days, that they were not good at all. Just as we are living better now than then, we believe the *AMAZING STORIES* of to-day is better than ever. The stars as a rule show no halo, even though their light has to penetrate the atmosphere. In the vacuum of space they would show none. Meteors, as far as we know, are very uncertain in their ways; asteroids are definite. The latter could be avoided as you suggest, but not meteors.—*EDITOR.*)

#### Stories and Illustrations Commented On *Editor, AMAZING STORIES:*

I hope this letter finds its way into Discussions, as I have A. Merritt's new fantasy-yarn, "Dwellers In the Mirage," and Ray Cummings' "Man Who Mastered Time," which I would like to exchange for the following 1934 issues of *AMAZING STORIES*: January, February, March, April, May, June and July.

Both books are in good condition and have original jackets. Both are regular two dollar novels. If any readers would like to exchange the afore-mentioned magazines for these books, please communicate with me as soon as possible. I promise to answer all who write to me, promptly.

Now for the March number. J. W. Campbell's serial was swell, but the serial just beginning is based upon the same idea—that of improving or rebuilding Mother Earth. The first chapter is excellent, however, and it appears to be a very interesting and exciting story.

I notice that Mr. Jones evidently does not intend to end the Jameson series with the latest yarn. It seems as though it is just another adventure of Professor Jameson. It was good reading, though. So, write on, Mr. Jones, by all means.

"Interference," though it was based upon a somewhat hackneyed plot, was well written, and captured my interest from the beginning. Mr. Sheridan shows promising style. Let's have some more from him, please. Your other stories were okay, and Discussions as interesting as ever.

I have one fault to find with you, however. That is your constant use of Morey. Morey's cover for February, 1935, was excellent. His black and whites are not so good. The illustration for a story influences the impression the actual story will make on the average reader! Give us a little variety. With some competition, I am sure Morey will improve. Well, now that that's off my mind, I guess

I'll hang up, and spare everybody's feelings.

Corwin Stickney, Jr.,  
28 Dawson Street,  
Belleville, N. J.

(We have slightly modified your remarks about our illustrations. There is a reason, as an almost proverbial expression has it. A color drawing on the cover displays an artist's quality sometimes in a higher degree than a "black and white."—*EDITOR.*)

#### Notes on Recent Stories *Editor, AMAZING STORIES:*

The more you get by John W. Campbell, Jr., the better I'll like it. "Conquest of the Planets" is easily the most interesting story in the February issue. Campbell always turns out the best in science fiction.

"The Island of White Mice" was a very interesting John Taine story. David H. Keller is one of the old stand-bys of science fiction.

"Valley of the Rukh" by Harl Vincent was an interesting piece of fantasy.

I didn't care much for "Seven Perils to Quiches." I thought it was out of place in *AMAZING*!

Jack Darrow,  
4224 N. Sawyer Avenue  
Chicago, Ill.

(This letter needs no comment. The liking or disliking a story is, of course, in many cases a matter of taste. J. W. Skidmore is one of the favorite authors with our readers; he wrote the "Seven Perils" story, and it impressed us very favorably.—*EDITOR.*)

#### A Tribute to Our Authors *Editor, AMAZING STORIES:*

Though this letter may be short of words, I think I convey my meaning very clear. There is a saying that most of us have heard, and that saying is: "There is nothing new under the sun." Well, I doubt that very, very much. Reason: *AMAZING STORIES* have authors that can create characters, and not only that, they can make them seem actually to—come to life. You can read the stories in A. S. and seem to live the life of the characters therein. Best wishes, and I will stick to the end with you and your authors.

J. I. Long,  
817 S. Second Street,  
Louisville, Ky.

(While the above is a tribute to our authors, as the magazine is built largely upon them, we feel that we can accept it as applying to *AMAZING STORIES*. We thank you for your letter.—*EDITOR.*)

#### A Request for Correspondents from One of Our Readers

*Editor, AMAZING STORIES:*

I have just finished the March, 1935 issue; it was marvelous and it kept up to the stan-

dards of AMAZING STORIES. The stories were fine. I rate them thus: "Interference," by Max C. Sheridan, very good. Let's have more of him. He is a very promising author. "Millions for Defense," another corking good story. I would like to have more stories by Miles J. Breuer. "Zora of the Zoromes," as for that, it was super-super-super, etc., excellent. Are there any more of Professor Jameson's stories in the offing? If so, procure them. "The Body Pirate," by Ed. Earl Repp, was another star story. Let's have more by E. E. Repp. "The Conquest of the Planets," lived up to J. W. Campbell's standard of excellent stories. I would like to have, if possible, more of this type.

I have been reading stf. for some years now, and I think it is a good repast for someone who loves fantastic adventures dealing with the imaginative and scientific.

If this letter gets in "Discussions," I would like to have other readers communicate with me.

John V. Baltodonis,  
1700 Frankford Avenue,  
Philadelphia, Pa.

(We do not know what the authors you name will do after reading your encomium on their work. If you will look over Discussions in recent issues you will find a number of writers who wish to have correspondents. There will be no trouble for you to have them from Australia and New Zealand to England, east and west of the United States.—EDITOR).

#### A Tribute to Artist and Authors

Editor, AMAZING STORIES:

Just a few lines to let you know that your stories are improving greatly and I now enjoy them immensely. Your covers are also now improved and they show up well. Morey is good. Keep him. AMAZING STORIES is sure now owning up to its name—amazing, and I'm glad to see that A. S. has greatly improved in such a short time. My favorite authors are Dr. Keller, Harl Vincent, Eando Binder and John W. Campbell, Jr. Try to have more work by these great authors in future issues especially stories by the great Dr. Keller.

Your stories are very good and well written. Each issue grows better and better. Try to have more stories pertaining to or similar to biology. Correspondence with science-fiction fans is always welcome.

Wishing AMAZING STORIES great success.

LeRoy Christian Bashore,  
310 North 7th Street,  
Lebanon, Pa.

(The authors you name are still with us, and we are certain they will give you stories in the future. This letter will be read by them, we are sure, and will incite them to new efforts. It is more or less of a problem to obtain stories based on natural science, yet at the same time

each one being "something different." It is a real pleasure for us to look over our old time authors and to find so many still with us.—EDITOR.)

#### A Writer Who Says He Has Nothing But Brickbats for Us.

Editor, AMAZING STORIES:

Once again I find reason to write to you, and this time I have only "brickbats" to offer you. Here they are:

You state in the July, 1934, issue that you are unable to understand why your expressed opinion on the possibility or not of space travel should arouse such a storm of criticism from your readers. I don't think that anybody has any objection to your own personal opinion on the subject, if you express it as such. But you do not do this. You state very definitely that "we" don't believe space travel to be possible, and give a few "proofs" which may demonstrate the impracticability of this form of transport in the present day, but which do not prove that it may not be possible some time in the future. AMAZING STORIES is a scientific magazine and scientists have no such word as "impossible" in their vocabulary. "Cold fact tomorrow" is supposed to be the magazine's motto—its fields of imagination are limitless, its every ambition, if you excuse the word, seems to be to conduct a crusade against the word "impossible." All its staff, its authors, its readers are or should be, people who refuse to believe that there is any obstacle which cannot be overcome or any dream that may not be realized somewhere, at some time, by the work of science or nature. Now, if this magazine wishes to express its opinion it does so through its editor, who, knowing that he is expressing the thoughts of the very soul of the magazine, speaks, like royalty, in plural tense. (That may be wrong, but you know what I mean.) Well, you can't tell me that when you say that you believe space travel to be impossible (you'll have to excuse all these blots and scratchings out, because I'm not going to say all that again) that you're speaking for the magazine itself, in spite of all the "we" and "our." You are obviously expressing your own more or less bigoted opinion on the matter, and that's what the row is all about. You should have simply written your opinion in the first person, and signed it with your name and address, just the same as we readers have to do. Then there would have been no trouble. But I object, and I think the other readers do, to your speaking for the magazine when it was really your own personal thoughts you were voicing, thoughts absolutely foreign to the ideals of AMAZING STORIES, and, I hope, to a large number of its readers also. However, this criticism is, after all, only my somewhat bigoted opinion, and, anyway, who am I?



Now about slang. This is all right in its proper place, and emanating from a character in a book is harmless. But in America it always seems to get put in the wrong place. Newspapers and radio announcers and certain writers in "dime" publications seem to be unable to distinguish slang from English. "Cops Nab Gangster in Bank Hold-up," which I saw in an American newspaper, would never be properly understood by an Englishman if it appeared on the front page of the *Times* one morning. He would understand it in a book or play and get the gist of the sentence as spoken by one of the characters, but as an item of news it would need to be "Police Arrest Criminal During Bank Robbery," or something of that nature.

I don't mind what Dr. Smith's characters say or what form of speech is used by gunmen or chorus girls in movies—everyone uses slang more or less, in all countries, but all manage to keep it in its proper place and out of newspapers and publications and radio announcements.

Americans are apparently not so particular, from what I've seen of their newspapers and heard of their spoken announcements (news-reels, for instance), where correct English should be used. America also sees fit to leave out the "u" from such words as "colour," "harbour," "odour," "labour" and many others; calls "programme" "program," and gets from nowhere such words as airplane for aeroplane, airdrome and airport for aerodrome and airport, and inserts an "e" in whisky and an "h" in veranda. There are many others too numerous to mention. You might say that these alterations make for easier spelling, but you can't change a law in mathematics or a rule in golf to make the problem less difficult or the game easier to win. And, anyway, who am I to make the problem less difficult or the game easier to win.

The language is set down in definite channels and these must be used. After all, it's not your language, it's England's, and if you don't like it the way it is, you had better get one of your own.

R. McNairn  
11 Park Street  
Clovelly, Sydney  
Australia

(We wonder if you know the American slang word "batty"—it may sometimes apply to "brickbats" or to one who throws them. "We" is the editorial first person pronoun, so "we" have apparently offended you in using it. There is nothing about or relating to "royalty" in this use of the pronoun "we." By fairly desperate efforts man has risen some ten miles above the earth, with the sacrifice of several lives. Even the claim of ten or eleven miles is open to question. You speak of there being "a row about" expressing our own "more or less bigoted opinion" on space travel. Then

you go on to refer to your own "somewhat bigoted opinion." So your humble Editor is not alone in what you consider bigotry. In a general way words ending in or adopted from the Latin are properly spelled with the English "u" omitted. Both spellings are admitted here. The word "arbor" and some others are taken one letter further from their origin by the penultimate "u." As the Latin word "aër" never has an "o" in any of its cases "we" approve the plain English word "air" where possible instead of the hybrid "aero." You cannot personally change a rule in golf, but you can change your clubs. The United States, with one hundred and twenty-five millions of inhabitants, has some rights in the language question.—EDITOR.)

#### Some Questions Answered by the Editor EDITOR, AMAZING STORIES:

Although I have been a steady reader of your magazine for many years, it was only recently that I began saving your magazines. In regard to them I would appreciate it very much if you would answer the following questions:

When was AMAZING STORIES first issued? When was the small size first adopted? Has it always been a monthly? Was it ever discontinued for a month or more? In addition I would like the same information about the Quarterly.

Your magazine has, in the past, provided me with much enjoyment. Hoping that it will ever so continue,

GILBERT COHN,  
Brooklyn, New York.

[The first issue of AMAZING STORIES was April, 1926. The small size was adopted with the October, 1933, issue. It has always been a Monthly except that August and September (1933) were combined. This is the only discontinuance in the record. The Quarterly is more irregular and will probably always be so.—EDITOR.]

#### A Criticism from Scotland EDITOR, AMAZING STORIES:

AMAZING STORIES never "slips up" in science? What about "The Moon Waits"? A rigid tube extends from the earth to the distance of the moon. The moon end must travel roughly 31,000 miles per hour away to earth's rotation. The moon itself travels about 1,000 mph. Result—a difference of 30,000 mph. in relative speed. And to crown all when the earth end of the tube is broken, it still retains its exact position over the earth in spite of all celestial laws. It will not help to say it is for the sake of the story. Sheer drivell

W. A. Gibson,  
Rowanbank,  
Bathgate,  
West Lothian, Scotland.

(Your friend, Robert Burns, says: "The best laid plans o' mice and men gang aft a-gley." And our editorial plan has certainly met that fate. If you will turn to page 96 and read question 8 in the questionnaire you will see that you are not the only one who saw the error. It was perfectly obvious to the Editorial Staff, and that led to our putting in question 8 to see if many of our readers would detect it. We thought that the question was an interesting test.—EDITOR.)

**A Very Friendly and Appreciative Letter  
from Canada**

*Editor, AMAZING STORIES:*

I just finished reading the November issue of our magazine. I have never written you before, but I always read the letters in the back of the magazine. I think it is a wonder. I have been reading it for about a year now and I can hardly wait from one issue to another. I only wish it were published every week instead of every month.

I like the magazine just as it is and have no remarks to make about it, only print it oftener. When does the Winter issue of the Quarterly come out? I would like to know so I can get it as soon as it comes out.

Please make **AMAZING STORIES** a twice a month magazine at least.

Willis Blair,  
Cardinal, Ont.

(The Quarterly will be somewhat irregular in dates of publication. We have sometimes felt like discontinuing it definitely. Your letter is appreciated as an encouragement to our humble efforts to please our readers.—EDITOR.)

**Quarterlies and Monthlies for Sale**

*Editor, AMAZING STORIES:*

I have on hand a set of **AMAZING STORIES QUARTERLIES** dating up to Fall Edition 1932 and the following **Monthlies**, which I would like to dispose of for cash. 1926—August, October, November, December. 1927—Entire year January to December inclusive. 1928—all but the January, July and September issues. 1929—June to December. 1930—Complete. 1931—January, February, March, April, May and November. 1932—Complete.

J. R. Hirschman,  
3910 Avenue J,  
Brooklyn, New York.

**A Canadian Reader Gives His Comments on  
AMAZING STORIES**

*Editor, AMAZING STORIES:*

Despite the fact that I have been an avid reader of our (if I may presume to say so) magazine since Vol. 1—No. 1, this is the first time that I have endeavored (?) to write a letter to the Discussion column, perhaps it's because I'm too lazy. But let me say this, I hope to be able to continue in both reading

and writing to my favourite mag. as long as it will continue to be published. (All right, Ed., a slight slip there. The mag. will be published long after I have gone on "the long journey"—which I sincerely hope will not be for a good many years yet.)

I was more than pleased when I saw that you were publishing the mag. in Canada. I literally capered for joy when I heard the news. Even though the mag. was unobtainable over here for nearly a year I, for one, was able to get hold of the intervening issues. You may wonder at that. Ed., but it's true.

To me dear, old A. S. is the best mag. on the market, if not in all classes, in Sc. Fiction anyway. Rather a strong statement to make, but, nevertheless, I think that it is true. It leads all others by a wide margin in the type of entertainment and its stories.

A. S. has improved immensely since the first issue and is getting even better. Enough for eulogies and flowers, let's do a bit of discussing.

In regard to reprints I, for one, would say go right ahead and reprint some of the earlier stories in A. S. It is like meeting with old friends and—for your ears, Ed.—it saves me having to go and dig up the old issues. I do not wish you to publish reprints in the monthly, but to continue to get out a reprint quarterly—and make it much more regular than you have been doing.

I have made a tally of all those in favour of reprints and those against, and I found that the count was at least 10 to 1 in favour. Don't you think you'd better follow the dictates of the majority?

Before we leave the subject of reprints I see that you have quit reprinting stories by Verne and Poe. I'm much obliged to you for that, Ed., it's a relief to pick up an issue without either of these authors in it. Mind you I'm not adverse to reading these authors in the least, I rather like them, but they're not exactly appropriate for A. S. (Hum, I'm getting rather personal in opinions, I'd better quit.)

Time and time again I've read in the Discussions lists of stories that the writers would like reprinted. Why not follow their desires?

Keep Morey going. He's improving fast. By the way, I happened to look at the cover of the Jan-35 A. S. and I think that it is one of the best covers that you have had for a good long time.

I do wish you would get smoother edges on the mag. It is rather hard to turn the pages over. I may say, also, that I like the new small size; it's easier to handle.

As I said before the calibre of the stories is of the finest. Of course, there have been some "sore thumbs" as one writer to the Discussions termed it, but that can't be helped. Like as not there were many readers who en-

joyed these so-called writers' sore thumbs.

This is getting to be rather a long and drawn out epistle, so I will close by giving a list of my favourite authors—men you have rightly said are the founders of A. S.'s greatness. Campbell, Serviss, Coblenz, Keller, Burtt, Jones, Verrill, Vincent, Nathanson, Stone, Nowlan, Taine, Aladra Septama—say, who hides behind that pseud. anyway?—etc., I could go on endlessly, but I will spare your feelings, Ed.

C. Howes,

397 Davisville Avenue,

Toronto 12, Ont., Canada.

(This letter hardly calls for an answer or for comments. Our general idea is to publish quarterlies irregularly and to use them for reprints. We agree with what you say about the smaller size. We did skip one number, giving eleven issues to the year. In many cases copyright prevents reprints. We are gratified at the reception given our magazine in Canada. Your list of our "best authors" is not a complete one.—EDITOR.)

**A Complimentary Letter from a Canadian Lady, But She Does Not Like Our Artist**  
*Editor, AMAZING STORIES:*

Just a line to tell you how much I appreciate your magazine. Most of your stories are the very best money can buy. I especially like stories of Professor Jameson by Mr. Neil Jones, and I must tell you how much I enjoyed the story in the March issue "Interference" by Mr. Max Sheridan. It was so human. Your new serial "Earth Rehabilitators, Consolidated" sure promises to be a humdinger, but it should be a criminal offence to leave one stranded up in the air as I was when I read the fateful words: 'End of part I!' I might say before I give you my one brickbat (I hear you say "Oh gosh she has one!") my idea of heaven at its best is a box of chocolates and a new AMAZING STORIES magazine. Indeed a feast, both! Now comes the brickbat and its this: I am not keen about your artist.

Vera M. Forbes

76 Smithfield Ave.,

West Kildonan, Manitoba,

Canada.

(Your letter is quite delightful. The combination of our magazine with a box of chocolates is very fine, but it must be a large box to last out the magazine.—EDITOR.)

**A Most Amusing Letter of Good-Natured Criticism and Comment**  
*Editor, AMAZING STORIES:*

I can't see for the life of me why all these parrots that keep writing in every issue, doing their best to annoy Ye Ed. keep harping on the subject of even edges. I cannot remember

ever having been seriously annoyed by the uneven edges and usually I don't even take notice of the fact that the edges are uneven until I start reading the sippy comments of some of your equally dippy readers. And the fight about the large and small size—what difference does it make whether the magazine is large or small in size, so long as we receive the same amount of reading matter for our pennies? As a matter of fact, the small size is so much more convenient. Imagine sticking the large size into your coat pocket, or reading with one hand while hanging on to a subway strap with the other? I myself do not bind my issues into semi-annual groups but it seems to me that it is much easier to do so with the small size than with the large size. However, it makes no difference with me either way, and I'm sure a good part of your readers think the same.

I get a kick out of picking letters apart, and also the editor's comments, if they deserve picking. For instance, in a letter you printed in the February issue, I complained about your justification of "Delilah" etc., and you answered me by merely repeating in a somewhat different manner, your justification of those stories. Either you wrote that comment with your tongue in your cheek, or else you were taking unfair advantage of your position in being able to set forth an argument which has little or no chance of being answered in less than two months. I therefore exclaim indignantly, and with justification, "Nuts!"

I see in "Discussions" a request for a reprint of "The Moon Pool." Bool Hiss! Give 'im the hook! I see a request for "Skylark Three" and "Spacehounds of IPC." Now there's a sensible young gentleman. And in the same letter, I see that he does not like Morey's covers and illustrations. I wouldn't put it quite so strongly, although he should thicken up the legs a bit. I see he's played me a dirty trick in the March issue. There are no legs visible! But the February cover bears me out completely, unless that is what he thinks an inhabitant of Venus should look like.

Aha! I see those hated words "your rivals" again. An exhibition of sheer narrow-mindedness, fostered, I think, by your substituting asterisks where the name "\*\*\*\*\*" should have been. And now that I think of it, \*\*\*\*\* once your sister magazine, both being under the same editor, has fallen far below your own par and seems definitely on the downgrade, while another has been rising and has even exceeded you. Witness "The Skylark of Valeron" by Smith, and "The Mightiest Machine" by Campbell, in which the latter exceeds even his "Conquest of the Planets." This, by the way, was an excellent story while it lasted although it might have been better had it been longer.

Hooray! Staring me in the face is a corroboration of what I have contended vehemently and what you kidded me about in the Feb. issue. Mr. Arthur L. Widner, Jr. (God bless him) says "... why does Morey make such spindley legs on people?" Is your face red? I doubt it.

The next letter brings up a point that I have wanted to make for some time. In your heading you say "Compliments From a Young Reader." Going back to the first letter in the issue, you mention the "fair sex" in your comment. Now if I were so hair-brained as to stick my age into a letter, I'm sure I'd resent it, and if I were a girl, which I'm not, thank goodness, I'd feel like scratching your eyes out, or something, if you made such a fuss about it as to put it into your heading as well as in your comment. Now, this isn't the first time you've done that and it always burns me up. It's quite likely that you have quite as many, if not more, "young readers" combined with "the fair sex" as you have sedate, middle-aged gentlemen among your fans. Consider yourself reprimanded.

I guess now is as good a time to turn off the exhaust. Keep up the good work.

I forgot to mention that I thought the March issue an excellent one. "The Conquest of the Planets" didn't finish up the way it started out but was fine anyway, and "Earth Rehabilitators, Consolidated" bids fair to be twice as good.

I don't suppose you'll print this letter on account of my paragraph four. Shame on you, a science-fiction editor, exhibiting such narrowness. I could dare you to print but I won't because then you surely would and I'd look pretty cheap, wouldn't I? Ah, me, such is life.

Harold W. Kirshenblit,  
928 New Lots Avenue,  
Brooklyn, New York.

(Sometimes an *edition de luxe* book is published with rough end and bottom edges, so your view is to that degree justified, i.e., rough edges are all right. The large size was objectionable from the standpoint of the reader, because if the large size magazine was put in the pocket, it had to be folded and that injured it. Your complaint about our criticism of the story "Delilah" is not very logical, for how could a new criticism be evolved if the original one was correct? The *Moon Pool* has been published in book form. Morey needs no defense—he is a highly competent artist. We do not wish to criticize or publish criticisms of other magazines by name—that is why we use asterisks. Comparisons are said to be odious. Our rivals have our best wishes. This is not narrow-mindedness. We find that many young readers, 16 to 20 years old, put their age in their letters. A small proportion of our letters come from represen-

tatives of the fair sex, which is the reason for making special note of it, when we are so favored. What you call "narrowness" in your closing paragraph we think is courtesy.—EDITOR.)

#### AMAZING STORIES Magazines for Sale by a Constant Reader

Editor, AMAZING STORIES:

Will you please insert this short communication in the Discussions column. It has been three years since I wrote your magazine expressing any kind of an opinion.

I have read AMAZING STORIES since 1927 and I still have most of the issues since that date, something around 100 different copies. I haven't written lately because I have been working hard and finding very pleasant relaxation in reading the brand of science fiction which makes one think, such as one gets in AMAZING STORIES. Some of the issues have been inane and unsatisfying, some excellently written and a pleasure to read, stories by Dr. Smith, John Campbell, and a host of others, and every once in a while you get hold of a good new author. But I like the old standbys, who we know in advance of reading their stories are pretty likely to be good.

I now have a favor to ask. I have, as I said before, about 100 copies of AMAZING STORIES, including the works of Dr. Smith and John W. Campbell, Jr., complete, from July 1927 to the December issue, 1934, with only four magazines short, all in perfect condition excepting for covers, and I estimate 15 per cent of the covers are still attached. These magazines are punched and cord-bound in 6 month bindings, and all of the quarterlies you issued up to 1933 Winter edition are also on hand, in same condition. I will dispose of all these in a batch or single copies. I don't like to part with these magazines but finances, or rather lack of same, make it necessary. Purchasers may write for complete list.

This does not mean that I expect to discontinue reading the original Science Fiction Magazine, AMAZING STORIES. I expect to, perhaps ten years from now, have a ten year additional collection but hope to be able to keep it.

J. W. Murrow,  
Emergency Relief Administration,  
Pine Bluff, Ark.

(We hope that this will give you a chance to dispose of your set of AMAZING STORIES. The price you must tell applicants.—EDITOR.)

#### A Letter from an English Reader Who Has Had Some Difficulty in Getting His Copies of AMAZING STORIES

Editor, AMAZING STORIES:

I have been a silent semi-regular reader for about six years. By semi-regular I mean that I read AMAZING STORIES whenever I come

across a copy. This is how our mag is received in England. A newsagent buys 100 or so American magazines (assorted) Cowboy, Gangster and general roughstuff. If the Gods smile upon me they cause an AMAZING to be included in the 100 and as you can well imagine the news dealer has strict orders to reserve all copies. The price is 6c. I have to hand it to the December issue and I think the best story is "Men Created for Death" by Henry J. Kostkos. It certainly is a new slant on the synthetic man idea. Many of your correspondents criticize Morey's illustrations, but being no art critic I'll say nothing about him except that he depicts the action O.K. and after all that is all that is needed. I would like to see a few more time-travelling stories although I maintain that it is impossible. I like to see the ideas that are put forward by various authors. I'll close this epistle with two requests.

1. Better facilities for obtaining A. S. over here which I am confident would make money and more people stf. minded. 2. A few time travel stories.

Would appreciate hearing from stf. fans from anywhere.

J. Geary,  
196 Canterbury Road,  
West Croydon, Surrey,  
England.

(We are now working on improving the facilities for getting AMAZING STORIES to our English readers. There is similar trouble sometimes reported from Australia and New Zealand. Morey needs no apology from us—he is doing excellent work and we think he is becoming a favorite with our readers.—EDITOR.)

#### Room for Improvement in AMAZING STORIES Editor, AMAZING STORIES:

Just a few brickbats and bouquets for you. I guess the bouquets are welcome, but you had better dodge the 'bats. I would not attempt to list my dislikes or likes as the list would prove to be too long, and then, others of your readers have done it many times before.

At the present time A. S. is good, but believe me there is still some room for improvement. Although there are other science fiction magazines on the market, good ol' AMAZING STORIES ranks among the best. Regarding stories, I couldn't find anything wrong with the line-up in the March issue.

Perhaps it would interest some of your readers to know that there is at the present time an organization for lovers of science fiction and science. It is the International Cosmos Science Club, which publishes a monthly paper containing science fiction and scientific articles. Should anyone be interested I would be pleased to give full details.

Well, I'll cut this short, for if you should see fit to print this in your Discussions column, I want it to be short and sweet, and to leave room for others, that are perhaps, more worthy.

Herbert E. Goudket,  
707 Jackson Avenue,  
New York, N. Y.

(Your solitary brickbat is a very light one, and you write yourself down as an admirer of our magazine. Of course there is room for improvement—that exists on all sides of us. There is no barrier opposing advance.—EDITOR.)

#### A Vivid Diagnosis of a Well-Known Disease Editor, AMAZING STORIES:

Although I have been reading science-fiction literature off and on for the past ten years it wasn't until lately that I was stricken with an attack of disease popularly known as "science-fictionitis." This disease is noticed with symptoms of extreme excitement by the patient when coming in contact with a magazine bearing the "science-fiction" germ. His immediate response is to devour all stories he has not as yet read and then break out in violent argument with his immediate companions and editors of magazines. The next symptom is shown in a frenzied attempt to collect and hoard all back issues of this "disease bearing" literature and have lengthy discussions with himself as to the best story ever published. The last and worst stage occurs when he becomes unnaturally active in all functions and associations in which persons, who have like himself been bitten by the same "bug," gather. If the person recovers from these attacks and seems to be normal we assume he has recovered. He must be still closely watched as sometimes these symptoms reappear, as cases have shown, as long as twenty years later and some cases have continued over quite a period of time. Doctors have made little progress as yet in counteracting this "disease" and as records show two prominent doctors have actually helped to keep this epidemic alive. I offer my utmost sympathy to the families and associates of the unfortunate victims who have been stricken by this disease as I know quite well the suffering the said persons must go through having been stricken with it myself twice.

Hoping you never have to go through this experience, I am,

George G. Clark,  
8709 15th Avenue,  
Brooklyn, N. Y.

(A vivid description of a devotee's addition to science fiction. An amusing view is presented of enthusiasts in this line of literature.—EDITOR.)



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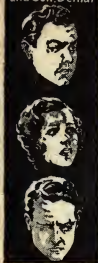
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